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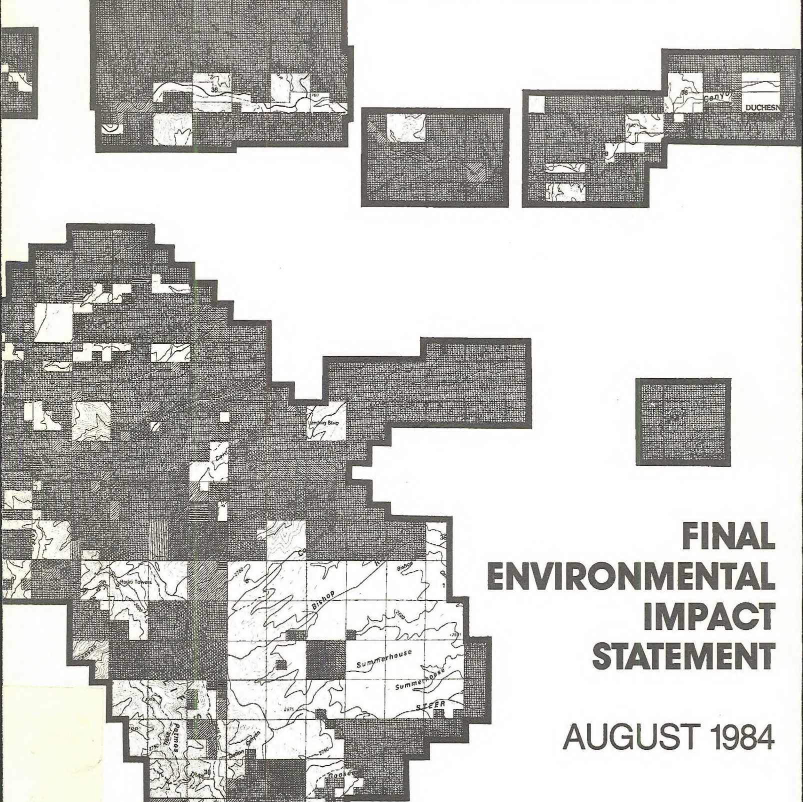
SUNNYSIDE COMBINED HYDROCARBON LEASE CONVERSION



FINAL ENVIRONMENTAL IMPACT STATEMENT

AUGUST 1984

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Moab District
P. O. Box 970
Moab, Utah 84532

IN REPLY REFER TO
1792
(U-064)

Dear Reader:

This final Environmental Impact Statement (FEIS) on the Sunnyside Combined Hydrocarbon Lease Conversion is provided for your information and use. An errata summary was prepared for the Air Quality Technical Report and a complete revision of the Socioeconomic Technical Report was prepared.

The Bureau of Land Management (BLM) would like to take this opportunity to thank the individuals and organizations who provided suggestions and comments on the draft EIS.

Copies of the draft EIS, final EIS, (errata summaries for the technical reports and revised technical reports) may be obtained from:

> Gene Nodine, District Manager, Bureau of Land Management, 82 East Dogwood, P. O. Box 970, Moab, Utah 84532. In addition, a limited number of copies may be obtained from the Public Room, Bureau of Land Management, Utah State Office, 136 East South Temple, Salt Lake City, Utah 84111.

This final EIS is not a decision document. Decisions on the requested BLM actions for the Sunnyside project will be based on the analysis in the final EIS, public concerns and comments, and other multiple-use resource objectives or programs that apply to the project. Please send your concerns about the project or other factors you feel should be considered in the decision to:

Gene Nodine, District Manager
Bureau of Land Management
82 East Dogwood
P. O. Box 970
Moab, Utah 84532

Written comments will be considered in the decision if they are received by September 24, 1984. A Record of Decision that outlines the decision and the rationale for it will be prepared and released to the public as soon as the decision is reached.

Sincerely yours,

Gene Nodine

District Manager

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DEPARTMENT OF THE INTERIOR

FINAL ENVIRONMENTAL IMPACT STATEMENT
on the
SUNNYSIDE COMBINED HYDROCARBON LEASE CONVERSION

PREPARED BY

BUREAU OF LAND-MANAGEMENT

AUGUST 1984

DISTRICT MANAGER - MOAB

Bureau of Land Management
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COVER SHEET

Sunnyside Combined Hydrocarbon Lease Conversion

( ) Draft (X) Final

Lead Agency

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of the Interior
Bureau of Reclamation
Fish and Wildlife Service
National Park Service

U.S. Department of Agriculture
Agricultural Stabilization and Conservation Service

U.S. Department of Transportation
Federal Highway Administration

Counties That Could Be Directly Affected

Carbon County, Utah
Emery County, Utah

Abstract

This environmental impact statement (EIS) assesses the direct and indirect environmental consequences of federal approval of conversion of existing oil and gas leases within the Sunnyside Special Tar Sand Area (STSA) to combined hydrocarbon leases. These lease conversions are proposed by five applicants—Amoco Production Company, Chevron USA Inc. - GNC Energy Corporation, Enercor, Mono Power Company, and Sabine Production Company. Each applicant has submitted a plan of operations for converting these leases. This EIS addresses the collective and cumulative impacts of the proposed actions, a partial conversion alternative and/or special mitigation, a unitized development alternative, and a no action alternative. Major project components include four proposed open pit mines, one in-situ area and four processing plants.

Collective impacts are those that would occur as a result of the proposed actions and alternatives. Cumulative impacts are those that would occur as a result of the proposed actions and alternatives plus interrelated projects planned for development in the Sunnyside STSA during the analysis period.

Based on the issues and concerns identified during the scoping process, the EIS analysis focuses on the impacts to water resources, socioeconomics, soils and vegetation, wildlife, recreation resources, visual resources, air quality, transportation networks, agriculture, cultural resources, paleontology and mineral resources, and wilderness resources.

Tar sand development would increase total dissolved solids, water temperatures, and suspended sediment while decreasing flows in tributaries to the Green River. Water use associated with tar sand mining and processing would come from the Upper Colorado River Basin, causing small, unnoticeable changes in flow and salinity.

Development of the STSA would cause a population increase ranging from 25 to 50 percent in the area of influence, as much as 500 percent for the most heavily impacted communities. Significant pressures would be placed on housing, other parts of infrastructures, and local government finances. Social structures and lifestyle would change. At the same time, the area would benefit from growth in employment, income, business, and improvements in the infrastructure and tax base.

Tar sand development would also disturb 35,945 acres of soils and vegetation with 6,500 acres being disturbed at any one time over a 40-year period. Impacts to vegetation would also include changes in pre-project vegetation diversity and inadequate re-establishment of vegetation in low precipitation zones.

Significant impacts to wildlife would include habitat destruction and displacement of animals into adjacent areas. Habitat losses could last nearly 100 years or until preconstruction forage production is achieved on the entire STSA.

Recreation opportunities in the STSA would shift from semi-primitive to semi-urban experiences. Hunting quality would diminish, and a portion of the Green River could be eliminated from any potential for wild and scenic river designation due to manmade structures.

Views toward the STSA from valley communities and highways to the west would be significantly and permanently impaired. Visual resources would also be degraded by a change of the visually sensitive mountains that form the background for the less dramatic foreground and middleground views from valley viewing areas.

Developing the proposed conversion areas and operating the associated processing plants are predicted to violate pollutant standards and increments. Present levels of total suspended particulates, sulfur dioxide, and nitrous oxides would be increased mainly within the Sunnyside STSA.

The increase in traffic volume would reduce below an acceptable standard some road segments within the area of influence. The increase in rail tonnage within the area of influence would exceed the capacity of the Denver and Rio Grande Western Railroad spur.

This EIS may result in amendments to the Price River Management Framework Plan.

The impacts that would occur from the project or any of the alternatives are summarized in the Summary.

EIS Contact

Comments on this EIS should be directed to:

Gene Nodine, District Manager
Bureau of Land Management
125 West, 200 South
P.O. Box 970
Moab, Utah 84532

Decision Process

The final EIS is not a decision document. A Record of Decision will be prepared and released to the public. Decisions on the use of public lands for this project will not be made until at least 30 days after the Environmental Protection Agency (EPA) Final EIS Notice of Availability has appeared in the *Federal Register.* During the 30-day period, written comments on the content of this final EIS (and the proposed planning amendments) or concerns that should be considered in the decision, will be accepted at the address noted above. Comments received during this period will be considered in the decision-making process.

Date EIS Made Available to EPA and the Public

Draft: November 7, 1983.
Final: August 24, 1984.

TABLE OF CONTENTS

TABLES

PREFACE

This environmental impact statement (EIS) presents facts and projections for the proposed conversion to combined hydrocarbon leases of existing oil and gas leases within the Sunnyside Special Tar Sand Area (STSA) in Carbon County, Utah. This EIS provides information on the proposed actions and alternatives to those actions to assist the public in becoming aware of the proposals and for use as one of the considerations in the federal decision making process.

The EIS has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's regulations for implementing NEPA, effective July 30, 1979.

Terms such as "collective" and "cumulative" impacts and "main block" are used throughout this EIS and have definitions specific to this document. Collective impacts are those that would occur as a result of the proposed actions and alternatives. Cumulative impacts are those impacts that would occur as a result of the activities of other projects in the area, whose impacts would occur in addition to and overlapping in time and place with the impacts of the Sunnyside projects. "Main block" refers to the largest contiguous block of land within the Sunnyside STSA in Carbon County.

This EIS consists of five chapters and nine appendices, which include the following information.

Chapter 1 describes the proposed actions and alternatives and presents an overview of the applicants' plans of operations and the assumptions on which this EIS is based. Chapter 1 also includes a data summary of the proposed actions and alternatives.

Chapter 2 contains a comparative analysis of the proposed actions and the alternatives.

Chapter 3 describes the environment that would be affected by the applicants' proposed projects and alternatives and presents an analysis of the environmental consequences (impacts) of implementing the projects. The impact analysis focuses on the commercial phase of development. Only those resources that would be significantly affected are discussed in detail.

Chapter 4 identifies mitigation measures, and describes the applicants' monitoring programs and the unavoidable adverse impacts of the proposed actions. Chapter 4 also describes the effects of implementing all the applicants' proposed projects on the long-term use of the environment and the benefits, trade-offs, and irreversible and irretrievable commitments of resources that would occur.

Chapter 5 presents comments on the draft EIS and responses to these comments. Information on consultation and coordination is presented in Appendix A-1.

The nine appendices contain data and analysis used to conduct the overall analysis presented in greater detail than the material in the text. The appendices are listed in the Table of Contents.

In addition to the five chapters and appendices in this EIS, two technical reports help support the EIS. Prepared for air quality and socioeconomics, these reports contain more detailed information than is presented in the main body of the EIS.

The technical reports can be obtained from

Gene Nodine, District Manager Bureau of Land Management 125 West 200 South P.O. Box 970 Moab, Utah 84532	or	Public Room Bureau of Land Management Utah State Office 136 East South Temple Salt Lake City, Utah 84111

SUNNYSIDE COMBINED HYDROCARBON LEASE CONVERSION EIS LIST OF PREPARERS

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SUMMARY

SUMMARY

The Sunnyside Special Tar Sand Area (STSA) has a high potential for tar sand development and a variety of resources and human activities that would be affected by such development.

Proponents of five tar sand projects have filed applications with the Bureau of Land Management (BLM) to convert existing oil and gas leases within the STSA to combined hydrocarbon leases in accordance with the Combined Hydrocarbon Leasing Act of 1981. Approval of the conversion applications would permit phased tar sand development. Because the location and extent of the resource are not known, project designs are conceptual. Should a lease be converted, a more site-specific environmental analysis would be needed before the types of commercial production addressed in this environmental impact statement (EIS) would be permitted.

Tar sand development within the STSA would cause impacts either by displacing resources (e.g. removing vegetation), using resources (e.g. consuming water), or changing conditions (e.g. introducing visual scars on the landscape or increasing the rate of community growth). Resource recovery on the conversion areas would use 70 percent of the tar sand reserves in the main block of the STSA in accordance with the proposed plans of operations. These plans estimate an individual project lifespan of 20 to 55 years, with a collective total project life of 74 years. Because not all the applicants have chosen to begin production at the same time, the five lease areas in the STSA would be producing bitumen for 70 of the 74 years.

AREAS OF CONTROVERSY

During the scoping process conducted throughout EIS preparation, several areas of controversy related to the proposed lease conversions arose. Major concerns included impacts to

- *domestic water sources;*
- *local communities (especially Sunnyside and East Carbon);*
- *transportation networks;*
- *public access to popular recreation areas;*
- *recreation areas such as Bruin Point, favorite local hunting and fishing areas, floatboating on the Green River, and Uinta Basin recreation areas (particularly those on the Uintah and Ouray Indian Reservation in the Hill Creek Extension area);*
- *air quality (particularly visual impacts to the Uintah and Ouray Indian Reservation airshed).*
- *important big game habitat; and*
- *air quality (particularly visual impacts to the Uintah and Ouray Indian Reservation airshed).*

A comprehensive list of the issues identified through the scoping process is presented in Appendix A-1, Consultation and Coordination.

MAJOR IMPACT CONCLUSIONS

Chapter 3 details the major impact conclusions from development of the Sunnyside STSA conversion areas as proposed in the applicants' plans of operations. Chapter 2 compares these conclusions with those of the alternatives. Impacts from development of each applicant's conversion area are summarized in Appendix A-2. The major potential impacts of the proposed actions are summarized below.

Water Resources

Surface disturbance would reduce water quality, surface water flow, and ground water movement. Total dissolved solids, water temperatures, and sediment levels are expected to increase in the main block of the STSA. If surface water is used for the projects, surface water flow would decrease. Spring flows are expected to be reduced by the removal of the water-bearing rock that feeds them. These flow decreases could affect Grassy Trail Creek, Nine Mile Creek, and Range Creek watersheds in the STSA as well as the Price and Green rivers.

Ground water movement would decrease in near-surface aquifers because of the removal of strata and fracturing of the aquifers. Changes in the water resources system would degrade the quality and decrease the amount of water in the main block.

The flow and quality of water outside the main block (Price River, Green River, and Colorado River at Imperial Dam) are not expected to greatly change due to the use of water in tar sand extraction. Flows in the Green River would decline by less than 1 percent. Salinity changes would vary, with a 1 milligram per liter (mg/l) increase or decrease in the Green River, little or no change in the Price River, and less than a 1 mg/l increase in the Colorado River at Imperial Dam.

Socioeconomics

Developing the conversion areas would have significant and potentially adverse impacts in the short term and beneficial impacts in the long term. The direct employment of 5,000 workers by 2005 would contribute towards a strong regional economy in Carbon and Emery counties but would place heavy demands on local governments, particularly in Carbon County, where demands would exceed current service capacity and fiscal capabilities.

Although central Utah's coal industry is operating at only partial capacity largely due to depressed coal markets, the recovery of coal production assumed in the baseline and from the interrelated projects would eliminate the relatively high level of existing unemployment. Tar sand development, however, would create problems of crowding, increase community growth needs, and cause public service shortfalls.

In the long term, revenues gained by affected jurisdictions would provide substantial local benefits and opportunities for improving local facilities and services. These prospects could be considered attractive by some, but short-term problems could create substantial hardships for newcomers and residents due to increased population and changes in lifestyle. In addition, collective development would increase the area's vulnerability to "boom and bust" cycles.

Soils and Vegetation

The proposed tar sand developments (including processing plants, spent sand disposal areas, and ancillary facilities) would collectively disturb 35,945 acres of soils and vegetation over a 74-year project life. A total of 6,500 acres would be disturbed at any one time during the 40 years of steady-state operation.

In assessing significant impacts, the analysis assumes that the applicants would implement effective erosion control, revegetation, and reclamation programs. With the implementing of the applicants' proposed reclamation procedures and the procedures required by BLM, soils are expected to be reconstructed to pre-project productivity and stabilized within 5 years.

The greatest impact to vegetation would be the change of pre-project vegetation diversity caused by the topographic and related microclimate changes caused by surface mining. Significant impacts could occur in the spent sand disposal areas (3,038 acres) in the low precipitation zones (climatic zones B and C, Map 3-2, map pocket of draft EIS) because adequate understory vegetation (grasses and forbs) could not be established within 5 years. Impacts to vegetation would be short term and insignificant, assuming successful revegetation based on intensive implementing of an effective erosion control and revegetation program.

Wildlife

Over a 74-year project life, construction and operation of the applicants' proposed projects would collectively disturb 35,945 acres of wildlife habitat or 43 percent of the STSA's habitat. Under steady-state operation, the total area disturbed at any one time would average 6,500 acres per year over the life of the projects. Critical deer and elk summer ranges would be disturbed, as would bird and small mammal habitat. Virtually all of the 53,454 acres of snowshoe hare habitat within the 35,945 acres of the main block would be lost because of permanent terrain changes.

Recreation Resources

Surface mining would significantly reduce the quality of sightseeing, hunting, camping, and off-road vehicle use at Bruin Point. Access to favored dispersed recreation areas could be greatly altered, and hunting opportunities and the quality of hunting experiences would significantly decline. Poaching and other game law violations would increase, further reducing hunting quality.

Semi-primitive recreation opportunities would shift to more semi-urban opportunities because of the area's development. Pump houses, access roads,

and other facilities could jeopardize any potential for the segment of the Green River from Desolation Canyon to the town of Green River to be designated as a wild and scenic river. The changing of natural characteristics of the upper reaches of Range Creek and the lessening of recreation quality along this stream could prevent it from being designated as a wild and scenic river.

Visual Resources

Developing the conversion areas would significantly change most of the areas converted (32,695 of the 35,945 acres disturbed) for the length of the projects by meeting the significance criterion of creating visual contrasts that would fail to meet the standards of BLM's Visual Resource Management (VRM) classes for the affected areas. The landforms would be changed; vegetation would be removed for long periods; and processing plants, utility systems, and other structures would be added to the landscape.

All areas of change that can be viewed from the valley areas to the west and south would be significantly modified. Impacts in these areas would be much more critical than impacts in areas not viewed from the valleys because the main block serves as a backdrop for visually sensitive valley views.

Collectively, 18,932 acres of VRM Class II areas would be significantly affected (fail to meet VRM standards for the area's class) by the projects, as would 7,268 acres of VRM Class III and 4,050 acres of VRM Class IV. The impacts on 2,445 acres is undetermined because the locations of ancillary facilities are not yet known. Collectively, the projects would not significantly affect 2,500 acres because these acreages would not be viewed from the valley areas.

Air Quality

Air quality and visibility would be reduced by developing the proposed conversion areas and operating the associated processing plants. National Ambient Air Quality Standards (NAAQS) for total suspended particulates (TSP) and nitrogen dioxide (NO_2) could be violated. Additionally, Prevention of Significant Deterioration (PSD) Class II increments for TSP and sulfur dioxide (SO_2) could be exceeded. The potential SO_2 and NO_2 violations of air quality standards and PSD increments, however, would be localized. Impacts would occur mainly at nearby elevated terrain. TSP impacts would involve a larger area than the area affected by gaseous pollutants because TSP would result from surface mining. The Sunnyside STSA would likely remain a non-attainment area (violation of NAAQS) for TSP during most of the mining years.

NO_2 emissions would impair visibility at the Uintah and Ouray Indian Reservation; plumes would likely be visible against the sky or a light background.

No visibility impacts from tar sand development are expected at any Class I or Colorado Category I areas. Acidic sulfur deposition in precipitation resulting from the tar sand development would be insignificant.

Transportation Networks

Project-related movement of people and materials would significantly affect the the Utah state and county road and highway system and the Sunnyside railroad spur. Vehicle traffic during construction and rail traffic during operation would exceed existing capacities, resulting in a slowdown of traffic and congestion of highway intersections. Railroad traffic would be congested at the rail yard in Sunnyside and on the rail spur between Sunnyside and Mounds.

Agriculture

Collectively, land disturbance from mining would cause an annual loss of 387 animal unit months of forage. This loss could have an unquantifiable but significant impact on ranchers using two allotments. No reduction in grazing preferences, however, is expected.

Prime or unique farmland would not be directly affected by project activities. About 933 acres (6 percent) of the 16,617 acres of irrigated cropland in Carbon County would be converted to urban uses to meet the needs of the collective population increase expected from the proposed projects. The sale and diversion of water from agricultural use to tar sand development would also reduce cropland. This loss of cropland would significantly affect agriculture (farming) in Carbon County.

Cultural Resources

Impacts to cultural resources could occur from exploration, open pit mining, in-situ recovery, plant construction, production transportation, off-site disposal, and other activities related to the construction and operation of tar sand facilities. Such activities could damage or destroy undetected surface and subsurface sites, causing losses of scientific and cultural information and a portion of the resource base for future research. This loss would permanently eliminate information needed to reconstruct the region's prehistory and history.

Paleontology and Mineral Resources

Some paleontological resources would be lost by resource recovery operations. As a result, these resources would be precluded from study and correlation with various strata.

The proposed actions would collectively remove 2.8 billion barrels of bitumen but leave 20 percent of the estimated resource in the Sunnyside STSA as unrecoverable. The recovery of other mineral resources in the STSA would not be affected by the mining of tar sand.

Wilderness Resources

Air and water quality deterioration could affect wilderness-related values. Plumes from NO_x emissions that might be perceived against the sky could degrade the visual quality for users in the northern portion of Desolation Canyon and Jack Canyon wilderness study areas (WSAs) and the Hill Creek Extension of the Uintah and Ouray Indian Reservation. Increases in sediment concentrations and water temperatures from surface mining along the upper reaches of Range Creek could degrade the quality of trout fishing in Range Creek, which flows through portions of the Turtle Canyon and Desolation Canyon WSAs.

UNRESOLVED ISSUES

During EIS preparation, the following issues and potential conflicts were identified that would be subject to further discussion, coordination, and action and that would need to be resolved outside the EIS process and following lease conversion: water resources, socioeconomics, split estate (differing surface and subsurface ownership of a given area of land); unitized development of the Sunnyside tar sand resource; uncertainty of national prospects for a tar sand industry; and secondary road access.

Water Resources

Some lands in the proposed conversion areas have been withdrawn as water supply reserves for the town of Sunnyside or for public water reserves. Should conversion be approved, these lands will require special stipulations to protect these water sources. Any conversions on the Sunnyside water supply reserve will also require special arrangements between the potential lessee and the town of Sunnyside. These stipulations and arrangements have not yet been fully developed.

Green River water could be used through an interim water service contract from Flaming Gorge Reservoir. According to the Bureau of Reclamation, water could be obtained from Flaming Gorge Reservoir for beneficial consumptive uses, but interim contracts for the use of this water would first require the approval of the Utah Division of Water Rights (State Engineer) for use and place of diversion. Other institutional requirements would also have to be met. The Utah State Engineer believes that water in perpetuity may not be available from Flaming Gorge Reservoir because of commitments of water for the Central Utah Project and for supply of Indian lands on the Leland Bench Project.

Socioeconomics

The extent to which socioeconomic impacts could be offset as a result of actions taken under Utah law is unresolved. Utah Code Annotated Section 63-51-10 (Supp. 1981) (Senate Bill 170) and the Carbon County permitting process require that developers of a major project submit a socioeconomic mitigation analysis. The analysis identifies the cost of providing socioeconomic services made necessary by the project and contains strategies to pay for the mitigation program. This legislation, however, mandates specific mitigation measures, and actual mitigation plans would be determined through negotiations between the project proponents, state agency representatives, and local government officials.

Split Estate

Surface and subsurface ownership within the STSA is extremely complex. The Federal Government may have subsurface mineral rights to an area whose surface is privately owned or may have rights to only certain minerals. Any decision on resource recovery on a conversion area would involve consultation with the surface owner, owners of other mineral rights, BLM representatives, and the lessee or operator before the surface is disturbed or the lease rights are implemented.

Unitized Development

Carbon County has stated that it prefers the concept of one coordinated tar sand project being developed within the STSA. (See Appendix A-1, Consultation and Coordination, Figure A-1-1, for letter.) A unitized approach to development might satisfy the needs and concerns of the county but cannot be required by BLM. All of the applicants have expressed interest in unitized development and have agreed to discuss unitization at a later date. Sabine Corporation is assuming an active lead by circulating a draft unit agreement.

This EIS analyzes a unitized development alternative because such an alternative is considered feasible for tar sand development within the STSA. This alternative, however, is based on a set of BLM assumptions rather than on applicant proposals.

Synfuels Uncertainties

Tar sand development within the STSA would be influenced by many complex factors, some of which are beyond the control of project proponents or agencies with authorizing actions. Such factors include (1) national policies on synfuels as related to other energy alternatives, (2) the availability of money in the private sector and the interest shown by large financial organizations, (3) the international price of oil, and (4) the effectiveness of energy conservation programs.

The uncertainty of these factors could continue indefinitely. Since the development of the proposed conversion areas would involve a relatively long exploration/pilot program phase and a 20- to 55-year-long financial commitment during commercial operation, the uncertainties would strongly influence decisions by the project proponents on the future scheduling and design of the proposed projects. Schedules and plans of operations discussed in this EIS represent the proponents' current objectives but may be revised as influenced by future events.

Synfuels uncertainties also make it difficult for local governments and others to plan services to meet the needs of project-related growth.

Secondary Road Access

The existing road system on public lands within the STSA is administered under a December 1980 Memorandum of Understanding (MOU) between BLM and Carbon County. Under this MOU, the two have agreed to build and maintain roads to meet multiple-use responsibilities and to build and maintain county road access to public lands in Carbon County. Various STSA roads are maintained and controlled by the private sector. Because private ownership limits access throughout the STSA and applicant tar sand operations could prevent public access to public lands and ranches, a formal agreement among the applicants, BLM, and Carbon County will be needed to maintain public access.

BLM-PREFERRED ALTERNATIVE

Conversion of all 23 leases under unitized development, including mitigation discussed in Chapter 4, is BLM's preferred alternative. Although this type of development must be negotiated among the lessees and cannot be required by BLM, BLM supports this alternative because it would lead to more efficient and orderly tar sand recovery consistent with diligent and reasonable environmental protection objectives of the Combined Hydrocarbon Leasing Act.

Unitized development would offer the following advantages: (1) the greatest amount of the STSA would be open for tar sand leasing; (2) lease boundary setbacks (safety zones between open pit mines) would not be needed, allowing mining continuity and more complete resource recovery; (3) only one plantsite would be needed; (4) oil production, estimated at 50,000 barrels per day, could be adjusted to conform to initial project feasibility factors for a single cooperative project; (5) the least amount of total land would be disturbed at any one time; and (6) disturbance and reclamation could be adjusted over time.

CHAPTER 1

DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES

CHAPTER 1

DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES

1.A INTRODUCTION

This environmental impact statement (EIS) was initiated by combined hydrocarbon lease conversion applications and proposed plans of operations filed by applicants of five tar sand projects—Amoco Production Company, Chevron USA Inc.-GNC Energy Corporation, Enercor, Mono Power Company, and Sabine Production Company. Each of the applicants has requested conversion of existing oil and gas leases within the Sunnyside Special Tar Sand Area (STSA) to combined hydrocarbon leases under the Combined Hydrocarbon Leasing Act of 1981. Based on the similar filing dates of the lease conversion applications and the 15-month application processing requirements of the Combined Hydrocarbon Leasing Act, decisions on the applications are required within similar time periods.

The projects analyzed in this EIS are highly conceptual. The impact analysis presented here is based on existing data and many assumptions. Should a decision to convert a lease be made, more detailed environmental analysis based on more defined project designs and more base data would be required before the types of commercial production discussed in this EIS would be permitted. The Bureau of Land Management (BLM) would conduct such analyses as part of its ongoing mine plan review and monitoring program.

This EIS is closely related to two other recently released EISs—the Utah Combined Hydrocarbon Regional final EIS (BLM 1984), and the Tar Sand Triangle Combined Hydrocarbon Lease Conversion EIS (NPS and BLM 1984). In addition, two combined hydrocarbon lease conversion EISs and six environmental assessments are in preparation: Circle Cliffs and P R Spring. These documents are scheduled for completion in late 1984 and early 1985.

The purpose of the Regional EIS is to analyze the regional impacts of the proposed federal combined hydrocarbon leasing program. The EIS also analyzes potential new combined hydrocarbon lease tracts and the BLM land use planning amendments needed for the combined hydrocarbon leasing program. The Sunnyside STSA is 1 of 11 special tar sand areas analyzed in the Utah Combined Hydrocarbon Regional EIS (BLM 1984) referred to as the Regional EIS. See this EIS for the analysis of impacts of potential new leasing (areas not under combined hydrocarbon leases) within the Sunnyside STSA and impacts of amendments to the Price River Management Framework Plan (MFP)(BLM 1983g). The Sunnyside Combined Hydrocarbon Lease Conversion EIS analyzes in detail the combined hydrocarbon lease conversions proposed for the Sunnyside STSA and is tiered to the Regional EIS.

The purpose of the Tar Sand Triangle Combined Hydrocarbon Lease Conversion EIS is to analyze the potential impacts of the proposed conversion to combined hydrocarbon leases of existing federal oil and gas leases within the Tar Sand Triangle STSA. The purpose is similar to that of this EIS.

1.A.1 Combined Hydrocarbon Leasing Act of 1981

The Combined Hydrocarbon Leasing Act of 1981 (Public Law 97-78), which amends the Mineral Leasing Act of 1920, was enacted to facilitate and encourage the production of oil from tar sand and other hydrocarbon deposits. The act redefines oil to include tar sand; provides for conversion of existing federal oil and gas leases and certain valid mining claims to combined hydrocarbon leases on special tar sand areas; and provides for the competitive issuance of new combined hydrocarbon leases within special tar sand areas (STSAs).

The Combined Hydrocarbon Leasing Act and associated regulations are pertinent to this EIS because they permit lessees holding valid oil and gas leases within designated STSAs to convert their leases to combined hydrocarbon leases if they meet regulatory and environmental compliance provisions. A combined hydrocarbon lease conveys the rights to all hydrocarbons located on the lease except coal, oil shale, and gilsonite. The lease conversion decision must be based upon a plan of operations submitted by the lessee/operator for tar sand development. If the leases are converted, a new lease is issued for another 10-year term to allow development of the tar sand resource. If the leases

are not converted, they remain as valid oil and gas leases until the original lease term has elapsed. Under the conversion regulations (43 CFR 3570), a decision on a conversion application must be made within 15 months of receipt of a completed plan of operations.

The five applicants whose plans of operations are assessed in this EIS held valid oil and gas leases within the Sunnyside STSA when their plans of operations were filed with BLM during November and December 1982. The terms of 18 leases for 25,462 acres have been suspended pending the processing of the lease conversion applications because the initial terms of the leases have expired. Should the leases not be converted, the leases would be terminated. The terms of the other five leases for 3,339 acres proposed for conversion have not been completed and could be extended beyond the normal termination date by timely drilling under the oil and gas regulations.

The Combined Hydrocarbon Leasing Act requires that conversion applicants file a complete, proposed plan of operations that assures reasonable protection of the environment and diligent tar sand development. According to the conversion regulations (47 CFR 3570), the plan may include an exploration phase, but must include a development phase. A plan of operations can be approved even though it may show that work under the exploration phase is needed to perfect the proposed plan for the development phase, as long as the overall plan shows reasonable protection of the environment and diligent hydrocarbon development.

A plan of operations may be amended before or after conversion of a lease or valid mining claim to reflect changes in technology, slippages in schedule beyond the control of the lessee, new information about the resource or the economic or environmental aspects of its development, changes to or initiation of applicable unit agreements, or for other purposes. BLM must approve significant changes to a plan of operations, at which time other governmental agencies and the public would have the opportunity to comment. These changes may begin the updating and supplementing of original environmental documents.

1.A.2 Purpose and Need for Proposed Actions

The purpose of each of the proposed conversions is to allow exploration for and ultimately development of the tar sand resource. After lease conversion and before development, more environmental analysis, permit approvals, and more NEPA compliance may be required by federal regulatory agencies. State and local agencies may also require more studies, permits, or approvals. The need for each conversion is related to the national demand for petroleum products and the national goal to reduce dependence on foreign oil as set forth in the Energy Security Act (Public Law 96-294).

The Energy Security Act was passed "...to utilize to the fullest extent the constitutional powers of the Congress to improve the Nation's balance of payments, reduce the threat of economic destruction from oil supply interruptions and increase the Nation's security by reducing its dependence on imported oil" (42 U.S.C. Section 8701(b)(1)). Congress found that these purposes can be served, among other ways, by (1) showing at the earliest feasible time the practicality of commercial production of synthetic fuels from domestic resources using the widest diversity of feasible technologies; (2) fostering the creation of diverse commercial synthetic fuel production facilities with the aggregate capability to produce from domestic resources in an environmentally acceptable manner the equivalent of at least 500,000 barrels of crude oil per day by 1987 and at least 2 million barrels of crude oil per day by 1992; (3) encouraging private capital investment in developing domestic sources of synthetic fuel and fostering competition in the developing the nation's synthetic fuel resources; and, (4) fostering greater energy security in reducing the nation's economic vulnerability to disruptions in imported energy supplies.

In recent years, domestic production of petroleum products has not kept pace with domestic demand. The Energy Information Administration's 1981 Annual Report to Congress shows that supply and demand have increased over levels established in the 1970s but that the imports rather than the domestic supply have been making up the difference (Table 1-1). (The Energy Information Administration's 1983 report considers total hydrocarbon supply and does not present specific data for petroleum derived from shale, tar sand, and synthetics. The Administration's 1981 projections for synfuels are the most recent.) Mid-range projections for 1985, 1990, and 1995 show domestic demand imports and total supply dropping from the 1979 level. Imports are expected to remain at almost 31 percent of demand by 1995. As in the past, long-term demand usually is expected to be greater than production.

TABLE 1-1
SUMMARY OF PETROLEUM SUPPLY/DEMAND BALANCE
(Million Barrels per Day)

		History			Mid-Range Projections		
	1965	1973	1979	1980	1985	1990	1995
Domestic Supply	9.2	11.3	10.9	10.8	9.7	10.1	10.9
Shale, Tar Sand and Synthetics	0	0	0	0	0.3	0.3	0.4
Net Imports	2.2	6.1	8.0	6.2	6.9	5.6	5.0
Total Supply[a]	11.4	17.4	18.0	16.9	16.6	15.7	15.9
Total Domestic Demand	11.5	17.3	18.9	17.0	16.6	15.7	15.9
Percent of Total Supply which is Shale, Tar Sand and Synthetics	0	0	0	0	1.81	1.91	2.52

Source: Energy Information Administration 1981.
[a]Numbers are rounded and, therefore, may not add up exactly.

The combined full production capacity of the five tar sand projects assessed in this EIS would amount to 115,000 barrels per day (bpd) by 1998 (Table 1-2). or 29 percent of the mid-range domestic synthetic production estimate for 1995.

Developing any of the proposed conversion areas would contribute to the maturation of the synfuels industry by applying present technology on a commercial scale.

1.A.3 Location of Proposed Actions

Map 1-1 (page 1-5 of Draft EIS) shows the location of leases proposed for conversion within the 157,445-acre Sunnyside STSA. The STSA lies within northeast Carbon and southern Duchesne counties, Utah, and the BLM Moab and Vernal Districts (Price River and Diamond Mountain Resource Areas). All of the proposed conversion areas analyzed in this EIS lie within Carbon County in the main block of the STSA as shown on Map 1-1. No lease conversions analyzed in this EIS are proposed for the scattered tracts of the STSA to the north and east of the main block.

1.A.4 Authorizing Actions

Decisions on the lease conversion applications will be based on the findings of this EIS and on the requirements of the Combined Hydrocarbon Leasing Act.

The basic action would be a decision on conversion, partial conversion and/or special mitigation, or denial of conversion of each of the 23 leases under application. If all or part of existing leases include sensitive resource areas and would only be partially suited for conversion and if reasonable protection of the environment is assured through stipulations, the lease would be converted in its entirety with sensitive areas protected by special stipulations. Where the Secretary of the Interior finds that reasonable protection of the environment will not be assured, all or portions of the leases may not be converted.

As a step in the lease conversion process, BLM would approve the plan of operations for each lease or for each applicant's group of leases. Approval of a plan of operations for converting an existing oil and gas lease to a combined hydrocarbon lease would authorize only those actions that are described in enough detail in the plan to allow BLM to analyze them fully. Such approval would stipulate those actions for which the lessee would have to submit more information for analysis before authorization of further development. Such stipulations may be included in the lease, or the approval letter may identify later phases of the plan of operations that are approved for conversion but that will need more information for analysis before on-the-ground activity

TABLE 1-2
SUMMARY OF PROPOSED ACTIONS

	Amoco	Chevron-GNC	Enercor	Mono	Sabine
Production (bpd)	50,000	10,000	20,000	30,000	5,000
Target Date for Full Production	1998	1997	1991	1990	1989
Project Life (years)	30[a]	30	20	33	55
Proposed Conversion (acres)	9,602.08	160.00	1,962.67	9,836.13	7,240.04
Mine Type	open pit	open pit	open pit	open pit	None
Process Type	solvent or retort	cold water flotation/ solvent extraction	hot water	solvent extraction	in-situ
Upgrading Type	None[b]	coking/ hydro- treating	coking/ hydro- treating	coking/ hydro- treating	None[b]

Note: bpd = barrels per day.

[a]Amoco has stated commercial operation life would be 20 years plus. For analysis purposes, a life of 30 years was assumed.

[b]No on-site upgrading is proposed in plan of operations. Crude product to be transported to existing refinery for upgrading.

is authorized. The plan of operations must contain enough information, as determined by BLM, to assure diligent development of those resources requiring enhanced development or mining methods and reasonable environmental protection.

With specific reference to the lease conversion applications for the Sunnyside area, approval of an applicant's plan of operations may be considered for the exploration and pilot plant phases if site-specific field clearances are satisfactory. Because not enough details exist to prepare full-scale operation plans, step-by-step operation plan approval may be needed as the resource is explored. Full-scale plans of operations can thus be developed for mineable segments of the leases.

Under the conversion regulations (47 CFR 4570), a combined hydrocarbon lease will contain all terms and conditions needed to ensure compliance with the plan of operations, including any needed stipulations that were part of the original oil and gas lease being converted. General provisions of an oil and gas lease that likely would be carried forward should a lease be converted are included in Appendix A-3. The impact analysis of the applicants' proposed plans of operations assumes compliance with these provisions.

All leases would be accompanied by stipulations requiring compliance with all applicable federal, state, and local laws and regulations. Each lease conversion applicant would be responsible for obtaining such other authorizations and permits. Examples of these types of federal authorizations and permits include those related to the Archaeological Resources Protection Act, Water Pollution Act, Safe Drinking Water Act, and the Clean Air Act. General measures required for some federal authorizations are listed in Appendix A-3.

The mines listed below make up part of the baseline and are also included in the interrelated projects. Because baseline projections for the coal industry are based on production estimates for the region rather than for individual mines, individual mines

have not been designated as part of the baseline or interrelated projects. Sixty percent of assumed coal mine production has been assigned to the baseline, and 40 percent has been assigned to interrelated projects.

1.A.5 Interrelationships

OTHER PROJECTS

Interrelated projects are projects with relatively firm plans for development whose activities would overlap in time with the proposed actions or alternatives and that would cause environmental impacts that would interact with those of the proposed actions or alternatives (Barber 1984). The projects found to have this potential to interrelate were the Chevron tar sand mine to be located on private land within the STSA (privately owned minerals), its associated processing plant, and 20 coal mines outside the STSA (shown on Map 1-3).

These coal mines are as follows (asterisks show proposed new mines):

Beaver Creek-Gordon Creek #2	Kaiser-Sunnyside
*Beaver Creek-Huntington 4	Natomas
California Portland-Soldier Creek	Plateau
Coastal States	*Pleasant Valley Coal Partners
Consolidation Coal Company	Price River
Coop	*Sundeco
*Energy Fuels	Tower Resources
*First Western	U.S. Fuels
*Genwall	Utah Power and Light
*Kaiser-South Lease	Valley Camp-Belina

The locations of these projects are shown on Map 1-2 (map pocket of draft EIS) and Map 1-3. These projects are considered in the cumulative impact analysis for those resources where project impacts would interact. The interrelated projects are expected mainly to bring more people into the area, affecting transportation networks, local government (socioeconomics), and outdoor recreation.

Within the STSA, several companies (including several conversion applicants considered in this EIS) have tar sand mineral rights to areas large enough to permit development. Because no firm plans for independent development of these areas have been proposed, however, their development is considered to be too speculative or conceptual for them to be considered as interrelated projects in this EIS.

Coal Mines Considered as Interrelated Projects and Transportation Networks

The Chevron-GNC development on private land is planned to consist of a typical open pit mine and a cold water flotation/solvent extraction processing plant (with coking and hydrotreating facilities) capable of producing 10,000 bpd of synfuel. Chevron Resources Company has applied to the Synthetic Fuels Corporation for help in developing the projects.

The mine would be located in sections 3, 4, and 10, T.14S., R.14E. and would cover 1,400 acres. The plant and spent sand disposal area would lie southwest of Sunnyside and cover 1,300 acres. (See Map 1-2, map pocket of draft EIS, for exact location.) About 2,900 acres, including ancillary facilities, would be disturbed over the project's 30-year life.

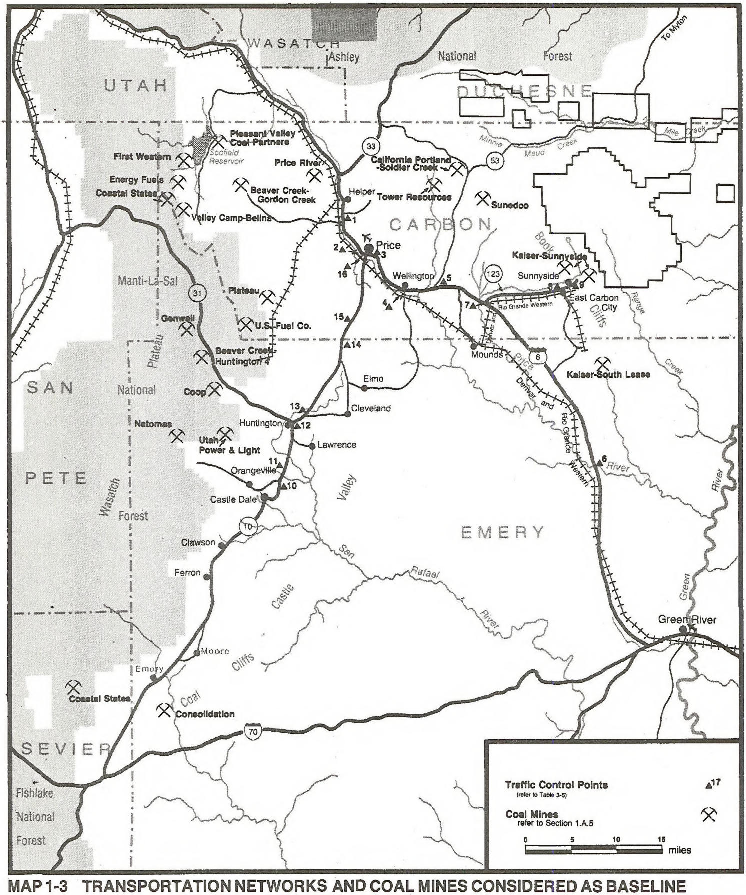
SPECIAL MANAGEMENT AREAS

Several different types of special management areas occur within the area that would be affected by the applicants' proposed plans of operations.

The management restrictions of four potentially affected special watershed management areas (Water Supply Reserve, a Public Water Reserve, Bear and Rock Creek watersheds and Range Creek watershed) are discussed in Section 3.A.1, Water Resources. The restrictions that apply to the three potentially affected wilderness study areas (Turtle Canyon, Desolation Canyon, and Jack Canyon) are discussed in Section 3.A.12, Wilderness Resources.

Desolation Canyon National Historic Landmark, which includes the Flat Canyon Archaeological District, is discussed in Section 3.A.10, Cultural Resources. In addition, the Desolation Canyon River Management Corridor lies within the area that would be affected by the applicants' proposed plans of operations and is discussed in Section 3.A.5, Recreation Resources.

The Uintah and Ouray Indian Reservation lies within Uintah, Duchesne, Wasatch, and Grand counties, Utah, about 8 miles straight-line distance from the the main block of the Sunnyside STSA, which lies in Carbon Couunty, Utah, south of Duchesne County and west of Uintah County. (Despite the closeness, the STSA is not easily accessible from the reservation.) The reservation is a federally recognized



MAP 1-3 TRANSPORTATION NETWORKS AND COAL MINES CONSIDERED AS BASELINE AND INTERRELATED PROJECTS

sovereign government entity with specific jurisdictions and responsibilities. It is administered by the Ute Indian Tribal Council and contains Indian tribal lands, Indian-alloted lands, and private lands. Both Indians and non-Indians live within this reservation.

1.B OVERVIEW OF PROPOSED ACTIONS AND ALTERNATIVES

1.B.1 General Description

This EIS considers the proposed actions of the five lease conversion applicants and three alternatives—partial conversion and/or special mitigation, unitized development, and no action. For ease of reference in text, tables, and maps, this EIS shortens the name of the partial conversion and/or special mitigation alternative to "partial conversion alternative," even though mitigation is an important part of this alternative. Table 1-3 summarizes the characteristics of the proposed actions and alternatives.

Under the proposed actions, all applicant-identified oil and gas lease tracts within the STSA would be converted. The impact analysis of tar sand recovery Table 1-3 Overview of Proposed Actions and Alternatives in the conversion areas and later processing is based on the project components and production rates of the applicants' proposed plans of operations and BLM assumptions required to analyze some of the more conceptual aspects of these plans.

Under the partial conversion alternative, only portions of the tracts identified by the applicants would be converted. The impact analysis of tar sand recovery and later processing is based on BLM assumptions about the number and type of project components and production rates. BLM derived this alternative to provide information on an intermediate leasing alternative. This alternative does not represent applicant views of potential project modifications, nor does it reflect any consideration of possible economic factors such as the economics of scale, which are correctly not included in an EIS analysis of the impacts to man's environment.

TABLE 1-3
OVERVIEW OF PROPOSED ACTIONS AND ALTERNATIVES

	PROPOSED ACTIONS	ALTERNATIVES		
		Partial Conversion	Unitized Development	No Action
Proposed Conversion Areas Included	All	Some	All	None[c]
Conversion Related Processing Plants[a] (number)	5+2[b]	2	1	None[c]
Total Conversion-Related Synfuel Production	115,000 bpd[d]	80,000 bpd	50,000 bpd	None[c]
Project Life[e]	74 years	49 years	94 years	NA

Note: bpd = barrels per day; NA = not applicable.

[a]Number of plants proposed/assumed to process conversion-related tar sand.

[b]Each applicant has proposed 1 main plant. In addition, Mono has proposed one main plant and two extraction plants.

[c]Because it is assumed that no conversion areas would be developed, there would be no conversion-related processing plants or synfuel production. However, it is assumed that Chevron's interrelated project (mine and plant) would be developed regardless of whether the conversion applications were denied. This project would produce 10,000 bpd over a 30-year period.

[d]The total production of the applicants may be somewhat less, due to boundary restrictions.

[e]The project life for the individual companies ranges from 20 to 55 years; the number of years from the start of the first project until the end of the last project is shown.

Under the unitized development alternative, all lease tracts identified by the applicants would be converted. The analysis of the impacts of tar sand recovery and later processing is based on BLM assumptions about how a unitized development operation could proceed.

Under the no-action alternative, none of the lease tracts identified by the applicants would be converted. The impact analysis of this alternative assumes that all interrelated projects listed in Section 1.A.5, Interrelationships, would be developed as now envisioned.

1.B.2 Land Status and Ownership

The proposed actions would occur in an area where surface and subsurface land ownership is complex. The Federal Government retains the tar sand rights to all the proposed conversion areas but does not necessarily have surface rights or other mineral rights to these areas. In many cases, the land surface is privately owned and the Federal Government retains only some of the mineral rights. Federal and private surface ownership in the proposed conversion areas is shown on Table 1-4 and Map 1-4 (map pocket of draft EIS).

1.C PROPOSED ACTION

1.C.1 General Plan of Operations

The Combined Hydrocarbon Leasing Act requires that conversion applicants file a complete proposed plan of operations that assures reasonable protection of the environment and diligent development of the hydrocarbon resource (tar sand) requiring enhanced recovery methods. The general requirements of a plan of operations are identified in the Code of Federal Regulations (30 CFR 3570). Some aspects of the applicant plans considered in this EIS are similar. The sections that follow discuss tar sand phased development. They do not necessarily describe with accuracy the actual approach to be used for any individual applicant's conversion area, but they provide useful background information. More specific details on an individual applicant's plan of operations are provided in Section 1.C.2, Applicants' Plans of Operations, and Appendix A-2, Summary of Applicants' Plans of Operations and Impacts.

EXPLORATION

The exploration phase would determine the quantity and quality of tar sand ore underlying the conversion

TABLE 1-4
SURFACE OWNERSHIP OF LEASES PROPOSED FOR CONVERSION
(acres)

PROPOSED CONVERSION AREA	SURFACE OWNERSHIP Federal	Private[a]	TOTAL AREA
Amoco	7,602.08	2,000.00	9,602.08
Chevron-GNC	160.00	0	160.00
Enercor	852.48	1,110.19	1,962.67
Mono	5,320.13	4,516.00	9,836.13
Sabine	6,200.04	1,040.00	7,240.04
Total	20,134.73	8,666.19	28,800.92

Note: Surface ownership is displayed graphically on Map 1-4 (map pocket).
[a]Private surface estate over the federal mineral estate proposed for conversion.

areas. For all applicants, the exploration phase would be critical to the design of plans for commercial development because existing oil and gas leases do not permit tar sand exploration. Current reserve estimates are thus speculative. Until reserve estimates are better defined, project plans can be only conceptual.

During the exploration phase, typical activities would include collecting geological, geophysical, hydrological, and geochemical data through field surveys, core hole drilling, and similar procedures. Typically, one or two field seasons would be required to collect the needed data to proceed to the test mine and pilot plant phase.

TEST MINE AND PILOT PLANT

The purpose of the test mine and pilot plant phase would be to obtain the data needed to develop final engineering design for a commercial level of development. Typically, small amounts of ore would be mined from a primary target area within the proposed area to be mined. This ore would serve as feedstock for a small (50 to 250 bpd) pilot plant, typically in an urban area (not necessarily the Sunnyside-Price area) with the delivery systems for power, water, and materials needed for processing.

From the pilot plant results, final designs for a scaled-up processing plant would be developed. This phase would continue for 4 to 5 years.

COMMERCIAL DEVELOPMENT

A commercial-level tar sand development within the Sunnyside area would consist of either a surface mine or in-situ extraction facilities plus a processing plant and spent sand disposal area (in the case of a surface-mine-related facility) and related ancillary facilities such as water pipelines, power lines, and product pipelines. Since in-situ extraction is proposed only by Sabine, it is not discussed in general terms in this section. (See the discussion of Sabine's plan of operations in Section 1.C.2, Applicants' Plans of Operations, for information about this resource recovery method.)

COMMERCIAL SURFACE MINE

Surface mining would be the most likely method of tar sand recovery in the western two-thirds of the main block, where 400- to 500-foot-thick tar sand seams are expected to occur at a depth of from 600 to 800 feet.

Mine excavation, including construction staging and mining start-up, are expected to run parallel with processing plant construction. At first, access and haulage roads would be built, the site would be prepared; ancillary facilities, such as those needed for power and water supplies, would be installed; and a pit or working area would be developed.

A typical commercial mine from the four surface mining proposals in hand would be developed as follows. Beginning at the outcropping of the tar sand, mining would resemble conventional contour mining on horizontal benches where the ore seams occur on flat or rolling land. Where the seams outcrop in steeply eroded canyons, the final pit slopes and working pit slopes would be determined by rock and terrain.

Because much of the area proposed for mining consists of high ridges and narrow canyons, overburden could be placed in the canyons, as shown in Figure 1-1. In some areas, after the first or second cut, overburden could be blasted so that a third of it is thrown into the adjacent open cut. Next, bulldozers would push another third of the overburden into the adjacent open cut, and the lower third would be loaded into trucks and hauled back and dumped into the second cut, as shown in Figure 1-2. This method would require bringing the trucks up a fairly steep grade, but it would leave the third cut open for easy ore removal. The original contour would not be restored at the end of mining.

Initial mining would result in spoil piles forming outside the mine operating perimeter, no matter which mining method is used. Depending on the size of the operation and the form of the ore and waste horizons, a large amount of material equivalent to several years of production would be placed in canyon fills.

A tar sand mine would employ methods and a variety of equipment typical of any large surface mine, including drills, shovels, draglines, graders, endloaders, haul trucks, crushers, conveyors, and support equipment.

Drainage control during mining is important and could be handled as shown in Figure 1-3. A dugout sediment basin could be dug on the solid bench surface. Runoff and pit discharge would then be routed

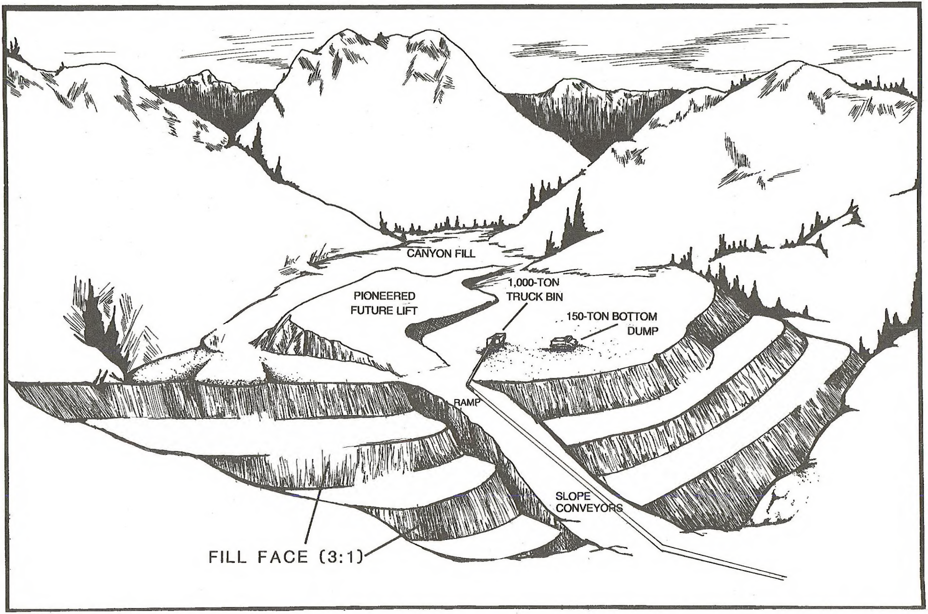
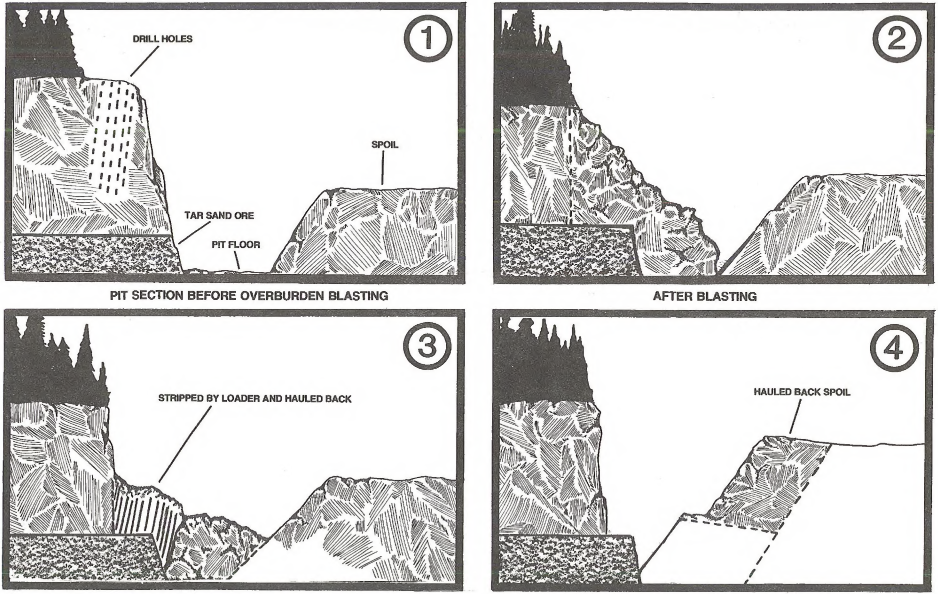


FIGURE 1-1 TYPICAL CANYON FILL OVERBURDEN OR SPENT SAND DISPOSAL SITE

Artists Conception: BLM



PIT SECTION BEFORE OVERBURDEN BLASTING

AFTER BLASTING

AFTER OVERBURDEN HAS BEEN DOZED INTO PIT

AFTER REMOVAL OF ALL OVERBURDEN

FIGURE 1-2 TYPICAL MINING SEQUENCE

to this basin via a rock-filled drainage ditch dug in the mine pit floor before overburden placement.

Overburden spoil dumps and ultimately the mined area would be reclaimed. Final reclamation of the canyon fills would consist of finish grading of the slopes, sealing of the pile surfaces, and establishing drainage control on the surfaces. The final grading would make the fills blend into the undisturbed land next to the piles. In the Sunnyside area, a reclamation surface with gentle slopes would be created to prevent excessive erosion from rain and snowmelt and to obtain satisfactory plant growth.

The overall reclamation process would include topsoil removal, spoil regrading, general dozing, topsoil spreading, revegetation, and land management. (See Appendix A-7 for a more detailed discussion of reclamation and erosion control.)

COMMERCIAL PROCESSING PLANT

The ultimate goal of the proposed plans of operations would be to produce synthetic crude oil for use in an oil refinery. To achieve this goal, the raw bitumen would need to be extracted from the host material and upgraded to desired specifications.

Figure 1-3 Typical Surface Mine Drainage Control
Run-of-mine ore would be delivered to a processing plant via an overland conveyor or other system from the tar sand mine. The ore then would be moved via feeders and conveyors to crushers where it would be reduced to the size required for extraction.

Three general processes of tar sand extraction could be used—hot water extraction, solvent extraction, and thermal extraction.

HOT WATER EXTRACTION

Figure 1-4 shows a conceptual process flow scheme for a hot water extraction process. During hot water processing, crushed ore would be processed in closed conditioning vessels with hot recycle water containing a small amount of soda ash. In these vessels, the bitumen would be separated from the sand, creating a bitumen-sand-water slurry. The slurry would then be processed in an air flotation cell where the bitumen would be separated from the sand and water. The water would be separated from the clean sand in a spiral classifier-thickener circuit and then recycled. The spent sand would be carried via conveyor or pipeline to the spent sand disposal area or tailings pond for disposal. The crude bitumen produced in flotation would be further cleaned of sand and water in a mixer-settler and distillation system. Typically, a hot water extraction process would remove 95 percent (by weight) of the bitumen from the tar sand ore.

SOLVENT EXTRACTION

A conceptual process flow scheme for solvent extraction is shown in Figure 1-5. In a solvent extraction process, crushed tar sand ore would be contacted with a solvent to dissolve most of the bitumen on the sand. After dissolution, relatively bitumen-free coarse sand would be separated from fine sand and sent to a washing step.

The bitumen-solvent/fine-sand slurry would be transferred to a fine sand washing and removal step. The coarse sand would be washed counterconcurrently with fresh solvent to remove the remaining bitumen. Sand and solvent would be separated and the sand dried to recover solvent. The wash liquor, containing a small amount of bitumen, would be sent to the fine sand removal and washing step.

The bitumen-solvent/fine-sand slurry would be contacted with the wash slurry from the coarse sand washing step. Fine sand in the liquid would be removed by settling, and the sand would be dried to recover the solvent. The solvent would then be stripped from the bitumen and condensed for recycling. Bitumen would be collected for transfer to an upgrading facility. Typically, a solvent extraction process would extract 95.5 percent (by weight) of the bitumen from the tar sand ore.

THERMAL EXTRACTION PROCESS

Research is underway to explore methods for recovering bitumen by high-temperature retorting. Although more difficult processing steps and close control would be needed, thermal recovery of bitumen would avoid the use of the water or solvent needed for near-ambient recovery processes and would bypass handling of the highly viscous bitumen. This extraction process could also require less energy than the hot water and solvent extraction processes.

When subjected to high temperatures, bitumen distills, cracks to form volatile compounds, and condenses to form coke and raw tar sand oil. The coke can then be burned to provide heat for retorting. Figure 1-6 is a flow diagram of a typical thermal extraction process.

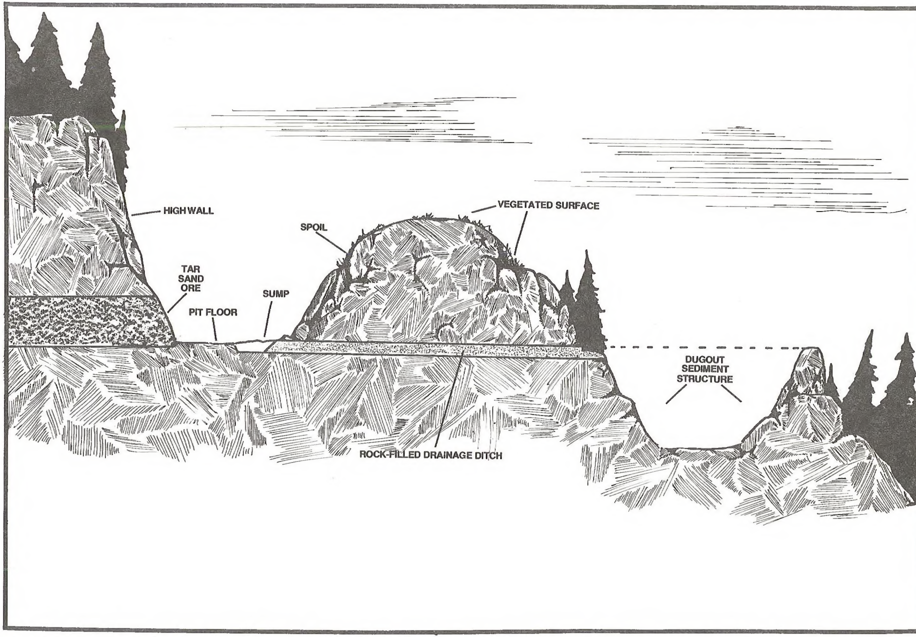


FIGURE 1-3 TYPICAL SURFACE MINE DRAINAGE CONTROL

Artists Conception: BLM

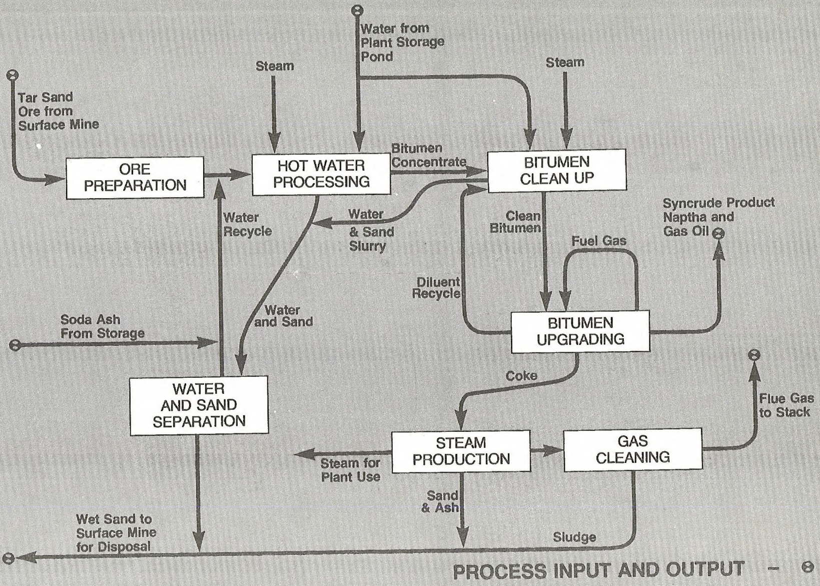


FIGURE 1-4 HOT WATER EXTRACTION PROCESS AND UPGRADING SYSTEM

Source: Enercor

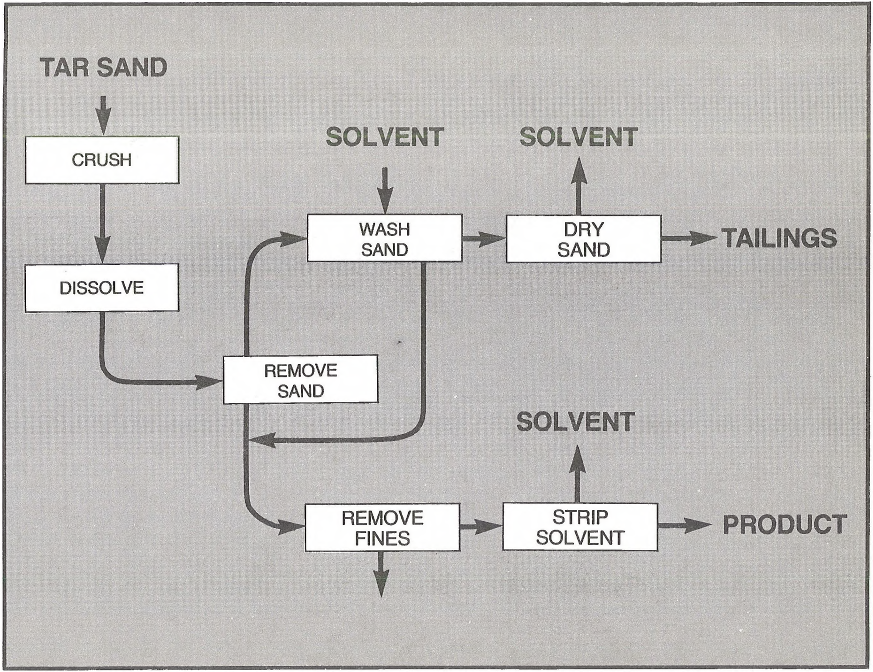


FIGURE 1-5 SOLVENT EXTRACTION PROCESS

Source: Amoco Production Co.

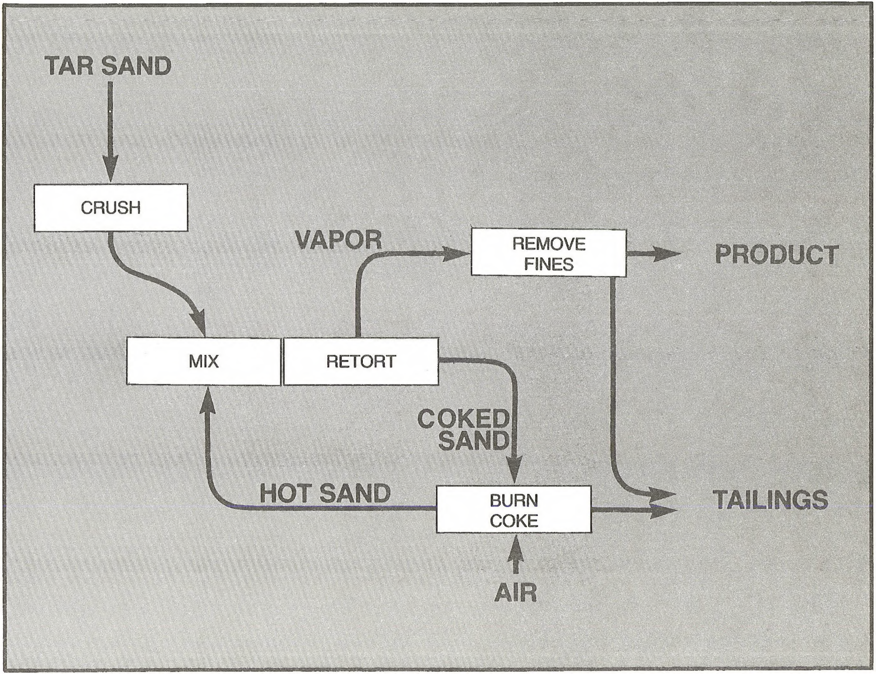


FIGURE 1-6 THERMAL EXTRACTION PROCESS

Source: Amoco Production Co.

BITUMEN UPGRADING

The purpose of bitumen upgrading is to convert the bitumen to a synthetic crude oil that is readily suitable for processing in existing refineries and to improve its transportation properties. Crude bitumen extracted through one of the previously described processes could be upgraded through coking, hydrotreating, or both.

Coking involves heating the oil to about 900°F to 980°F and then charging it into a vessel in which thermal decomposition removes coke, resulting in a less viscous and higher grade oil. The gas produced could be used as plant fuel along with the coke. Any excess coke could be sold as fuel.

Hydrotreating involves reacting the crude oil with hydrogen in the presence of catalysts to reduce sulfur and nitrogen content. This process also results in a less viscous, higher grade oil. The hydrogen needed for the process could be manufactured from process off-gas or purchased as natural gas. A Claus/SCOT sulfur recovery system typically would be used for sulfur removal.

SPENT SAND HANDLING AND DISPOSAL

The main solid waste stream produced by a processing plant would be spent tar sand. The spent sand would be either trucked or carried via conveyor from the processing plant to the disposal area, where it would later be reclaimed.

In the Sunnyside area, spent sand could be disposed of in a canyon, valley, or plain. The construction and final configuration of the pile would vary, depending on where it is disposed, as shown in Figures 1-1, 1-7, and 1-8.

Depending on the extraction process used, the spent sand could contain between 0.5 and 5 percent of the original bitumen as unrecovered material, 10 to 15 percent moisture, the silica sand present in the ore, and, in some cases, possibly a trace of soda ash or solvent. If a hot water extraction process is used, a small amount of air pollution control scrubber sludge would be mixed with the spent sand before disposal. The sludge is expected to contain two-thirds fine sand (by weight), which originated from the tar sand ore. The remaining third would be sodium bisulfate and sulfite produced from sulfur dioxide scrubbing with soda ash solution.

1.C.2 Applicants' Plans of Operations

In accordance with requirements of the Combined Hydrocarbon Leasing Act, each applicant has submitted a proposed plan of operations for developing the lease tracts proposed for conversion. As required by the regulations (43 CFR 3570), each plan addresses all phases of development, including relatively detailed exploration plans, more general plans for test mine and pilot processing plant development, and conceptual plans for commercial mine and plant development.

The proposed plans of operations are conceptual for several reasons. The tar sand industry is still in its infancy, and the industry has many research needs. Before developing any commercial projects, the industry needs more resource data and research on processing techniques and pilot testing of promising technologies.

In particular, the Sunnyside lease conversion applicants have limited data on which to base estimates of the tar sand reserves on the proposed conversions because their existing oil and gas leases do not permit exploration for tar sand. For all applicants, estimates of the location and extent of the tar sand reserves on the conversion areas are based on limited drill core data.

Until the quality, extent, and location of the tar sand reserves are more clearly defined, detailed plans cannot be prepared for pilot and commercial development. Similarly, until mine location, mining sequence, and processing plant locations are determined with greater accuracy, site-specific corridors cannot be determined for ancillary facilities, such as power lines, water pipelines, and product pipelines.

Because of these unknowns, assumptions must be made for aspects of the commercial tar sand operations that were not clearly defined in the plan of operations. Because the plans of operations for all five projects were received at the same time and because they involve adjacent lands within the STSA, BLM determined that the major portion of the analysis should address collective impacts. These assumptions are needed to analyze the proposed plans for making decisions on the lease conversion applications. The assumptions were designed to provide the decision maker with a plausible worst-case impact analysis. The assumptions concerning the proposed actions are outlined in the following section.

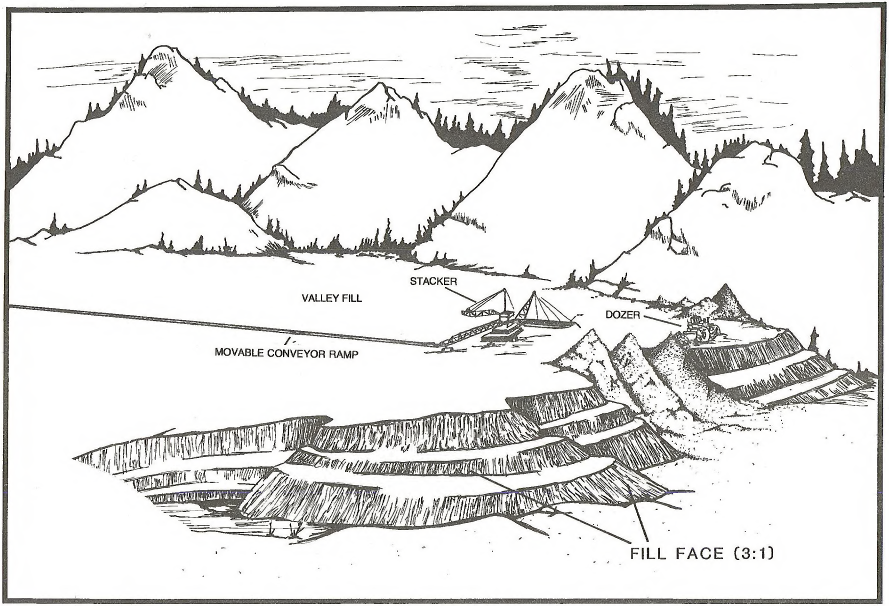


FIGURE 1-7 TYPICAL VALLEY FILL SPENT SAND DISPOSAL SITE

Artists Conception: BLM

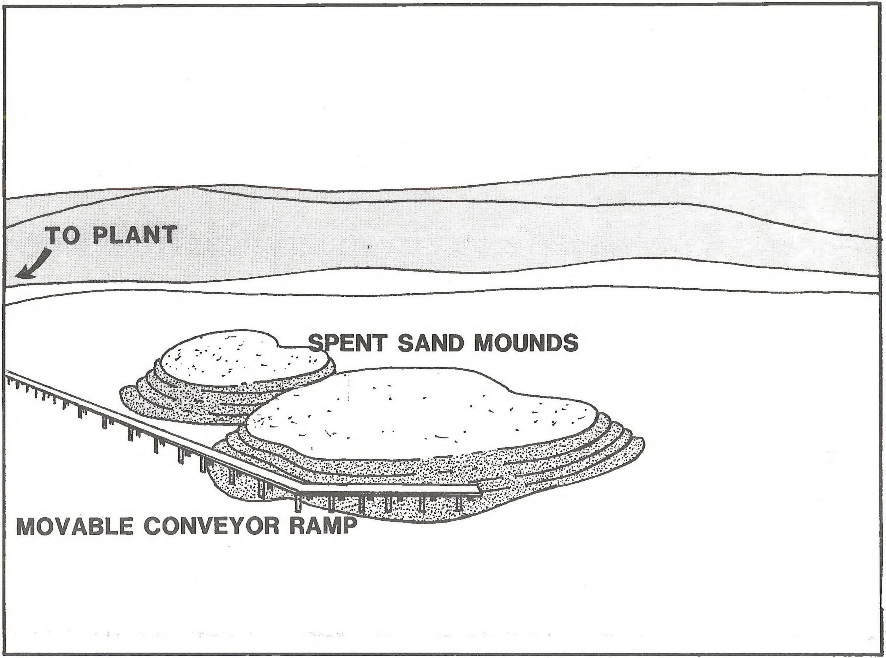


FIGURE 1-8 TYPICAL MOUND SPENT SAND DISPOSAL SITE

DEVELOPMENT ASSUMPTIONS

Land Disturbance Within a Conversion Area

Several applicants proposing surface mining did not specify how all acreage in the proposed leases to be converted would be developed. BLM thus assumed that all portions of the conversion area would be disturbed to varying degrees, from open pit mining and vegetation removal to travel ways with crushed vegetation. This definition of disturbance and the resulting range of disturbance to each indiviudal resource was used to analyze impacts. For example, sediment yield using 100 percent disturbance from this definition is less than sediment yield due to surface mining.

Areas of steep slopes and gullies were excluded from totals when they were considered unmineable because of terrain constraints or because the tar sand had been eroded away. This assumption is in accordance with 43 CFR 3540, "a plan of operations that is designed to serve as the application for a number of leases proposed to be operated as a unit shall explain how and when each lease included in the unit operation will be developed."

In instances where such explanation was unclear or did not fully explain the purpose of including lands in the proposed unit, a worst-case analysis of surface disturbance was used. The figures used thus represent the greatest possible amount of land disturbance. This assumption required that estimates of the area needed for spent sand disposal had to be increased somewhat over what was identified in the proposed plans.

Assuming that all portions of a lease would be disturbed allows for more of the resource to be mined. The applicants' total production levels were thus increased, not by increasing barrels per day but by extending the project life of their proposals. This assumption did not greatly affect the impact analysis, nor did it increase the acres disturbed at any one time. The individual project lives range from 20 to 55 years. Because all projects would not begin in the same year, however, tar sand mines can be expected to have an on-going project life of 74 years. The specific production-related assumptions made for each of the applicants are listed below.

- Amoco's plan of operations identified the actions that would be taken on a third of the area proposed for conversion (3,000 acres). For analysis purposes, however, BLM assumed the entire area proposed for conversion (9,600 acres) could be disturbed and that the additional spent sand that could be generated under this assumption would be disposed of in a mined-out area.
- Mono's plan of operations identified the actions that would be taken on half of the area proposed for conversion (4,500 acres). For analysis purposes, however, BLM assumed the entire area proposed for conversion (9,800 acres) could be disturbed and that the additional spent sand that could be generated under this assumption would be disposed of in a new pile next to the pile identified in the applicant's proposed plan of operations.
- Because the other applicants identified the activities that would occur on most of the area to be converted, BLM made no assumptions concerning the area to be disturbed. Chevron-GNC identified activities that would occur on 155 of the 160 acres proposed for conversion; Enercor identified activities that would occur on 1,500 of the 1,900 acres proposed for conversion; and Sabine identified activities that would occur on 6,000 of the 7,200 acres proposed for conversion.

Tables 1-9, 1-10 and 1-11 in Section 1.H, Data Summary, summarize the potential land disturbance projected in the applicants' plans of operations and the land disturbance assumed by BLM in the EIS analysis.

RECLAMATION AND LAND DISTURBED AT ONE TIME

For surface mining, BLM assumed that reclamation would occur in stages concurrent with mining operations. For the in-situ operation, BLM assumed that reclamation would occur in stages with the advancement of the wellfield. The assumed reclamation sequence is shown in Figure 1-9.

Calculations of land disturbance at one time were based on a determination of the amount of land that would be out of productive use during steady-state, commercial-level operations. Establishing enough understory vegetation (mainly grasses and forbs) to provide soil stability, erosion control, and initial livestock grazing is assumed to require 4 years. Longer periods of time would be needed for shrubs and trees to recover to effective wildlife habitat or near preconstruction conditions as discussed in

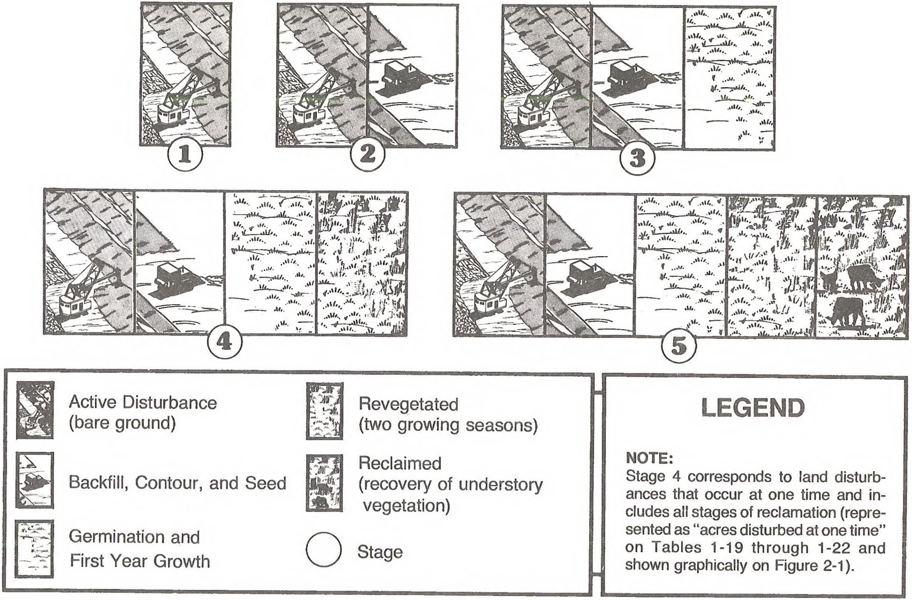


FIGURE 1-9 ASSUMED RECLAMATION SEQUENCE

Chapter 3, Section 3.A.3, Soils and Vegetation. Therefore, for the proposed actions considered collectively, BLM assumed that 6,500 acres would be disturbed at one time at a steady-state operation for 40 years. The different start dates and project lengths of the five projects were considered in determining these figures.

ANCILLARY FACILITIES

The applicants have identified only general locations of ancillary facilities. (For example, water would be piped from the Green River to the plantsite, and bitumen would be piped to Salt Lake City.) Therefore, average distances from point of origin to destination and average widths of disturbance for construction have been assumed for the major ancillary facilities (access roads, power lines, water pipelines, and product pipelines).

None of the applicants have yet requested rights-of-way for any ancillary facilities. Should an applicant's conversion application be approved and when project design is more clearly defined and specific rights-of-way applications are filed, BLM would require more environmental analysis before making a decision on those rights-of-way applications.

The following sections summarize each applicant's plan of operations as proposed and analyzed in this EIS. Specific project description data is summarized in Appendix A-2, Summary of Applicants' Plans of Operations and Impacts.

AMOCO

Amoco Production Company (Amoco) plans to convert seven leases on 9,602.08 acres. Their locations are shown on Map 1-2 (map pocket of draft EIS). Amoco's proposed plan of operations (Amoco 1982) identifies a seven-phase program for commercial production of bitumen as follows:

- Process development
- Exploration
- Pilot plant
- Test mine with access road
- Test mine and pilot plant studies
- Permitting commercial mine and plant environmental monitoring
- Design, construction, and operation of commercial mine and plant

Figure 1-10 shows an approximate schedule for this seven-phase program.

Exploration

Little information exists about the tar sand resource base on the leases being converted because of prior restrictions on tar sand exploration in the area. The coring program in 1982 concentrated on two leases in sections 21, 28, 29, and 33, T. 13 S., R. 14 E., (Map 1-2, map pocket of draft EIS). When this core data has been studied, projections will be made on which areas to explore next. The current conceptual exploration plan consists of drilling about 100 more core holes in T. 13 S., R. 13 E. to further determine the limits and bitumen content of the tar sand in the proposed conversion area.

Drill sites would be placed as close as possible to existing roads or jeep trails to minimize surface disturbance. Three new temporary roads, each 4,500 feet long, would be needed to service several proposed sites. Building of these roads would disturb 3.75 acres. In addition, building of short roads to provide drill rig access from existing roads or trails to drill sites would disturb 5 more acres.

Each drill site would need a bulldozer-leveled drill pad with an adjacent mud pit to prevent stream pollution. (Before drill site preparation, a cultural resource survey would be conducted at each site, and the site would be adjusted, if needed.) As few trees as possible would be removed. Upon completion of drilling, the drill site would be releveled and the mud pit filled in and leveled.

During drilling, public access and vehicular traffic would be regulated to protect the public, wildlife, and livestock from any hazards of the project. If improvements are damaged, they would be restored to their former state.

At the end of a season's work, all drill holes not to be used as water monitoring wells would be plugged as required by State of Utah regulations. The required state and federal authorizations also would be obtained for any open ground water monitoring wells.

All areas where soils and surface materials are disturbed during drilling or other operations incidental to this work would be restored to their natural state, when practical, by grading, recontouring, scarifying, installing erosion control structures, and reseeding. Unless otherwise approved, reclamation would be completed at the end of each drilling season.

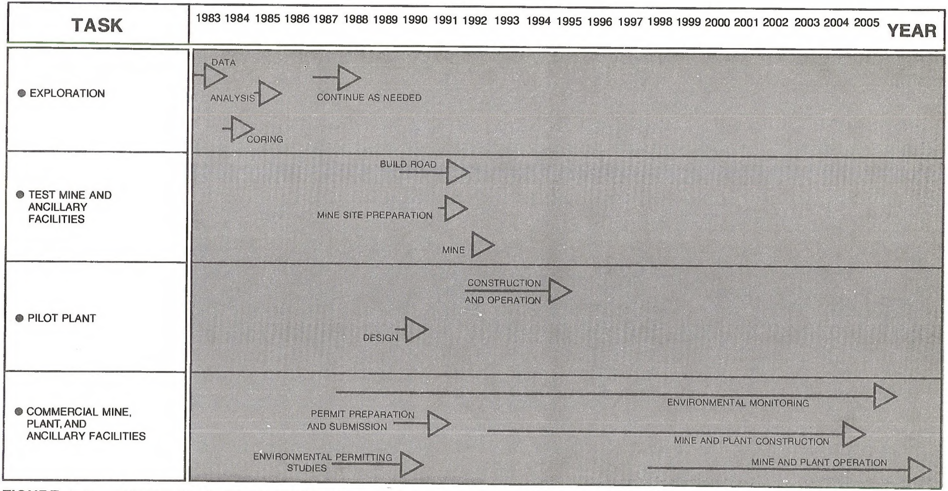


FIGURE 1-10 AMOCO PLAN OF OPERATIONS SCHEDULE

Test Mine and Pilot Plant

The test mine would be operated by a contractor during the non-winter season. The contractor would strip the waste and mine the ore in 1 year and truck the ore to the pilot plant.

The mine would be located near Bruin Point in NW 1/4 of Section 33, R. 14 E., T. 13 S. on 3 acres of federal land (Map 1-2, map pocket of draft EIS). The test mine access road would be built by improving Carbon County Route 123 and the existing Water Canyon Road to Bruin Point. From Bruin Point, access would be gained by continuing for 2.25 miles on a road going down into Dry Creek Canyon. An 18,500-foot-long spur road would be built from Dry Creek Road to the west end of the test mine pit.

The mine would employ 30 workers, including truck drivers. Few surface facilities would be required because of the temporary nature of the mine. Buildings would include a small maintenance shop and storehouse and office building.

The pilot plant is conceptually designed to be a nominal 150 bpd unit and to operate at a profit by mid-1993. It could be placed near Wellington, Utah, or more likely, outside the Sunnyside-Price area. The plant would have the following general requirements:

- *staff of 60 to 70 people*
- *10 to 15 acres of land*
- *50,000 gallons of water per day (55 ac-ft/yr)*
- *closeness to population center*
- *closeness to a railroad*
- *350 kilowatts (kW) of power*

Tar sand ore would be carried to the pilot plant via truck to Wellington or to a rail siding for shipment elsewhere, depending on the plant's location. Products from the pilot plant would probably be carried by rail or tank truck to the Salt Lake City area, where they would be used as feedstock for a refinery.

Pilot plant operation would continue for 1 year after the mid-1993 startup. During this period, the process concepts would be demonstrated, mechanical equipment reliability would be assessed, and data would be collected for the design and economic evaluation of a commercial-scale facility. If the project is feasible, as many as 6 years could elapse from the pilot plant's shutdown in 1994 to the operation of the first commercial module. This period includes 2 years for preparing an engineering design and 4 years for construction.

Commercial Development

After completion of the 10-year program outlined in the previous section, further process development could be needed. On this basis, the pilot plant would be revamped to incorporate the changes needed to show the technical and economic feasibility of the process. The pilot plant would have to be reactivated to provide feed for the operation.

Although a full-scale commercial unit might not be justified at the end of the development program, the pilot plant might be economic. In this case, the pilot mine could be reopened to keep the process facility operating.

The final process, which has not been selected, could involve either a solvent extraction or thermal extraction (retort) method similiar to those described in Section 1.C.1, Processing. On-site upgrading is not planned. The commercial processing plant would be built in section 35, T. 13 S., R. 14 E., as shown on Map 1-2 (map pocket of draft EIS).

A typical mining method would be used such as one described in Section 1.C.1, General Plan of Operations. Spent sand would be placed in the mined out pit or disposed of with the overburden. Bitumen from the recovery process would be shipped by tank car or pipeline to an off-site upgrading facility, most likely Amoco refineries in Texas City, Texas or in Salt Lake City. Ancillary facilities would consist of access roads, a water pipeline, power lines, and a product pipeline.

Additional Environmental Protection Measures

Issuing permits for the access road and pilot mine and plant would begin in 1990 at the same time as baseline environmental monitoring for a commercial facility. Before these activities could occur, however, Amoco would meet with Utah's Resource Development Coordinating Committee and BLM to familiarize these agencies with their planned development and to fully coordinate their activities with all interested state and federal regulatory and conservation agencies.

From 1983 to 1990, Amoco would review the project plans with all interested parties while addressing in detail the environmental concerns of their development. For example, a partial hydrologic field program

could be implemented during the test mine operations. Information from the test holes now in place, from a stream flow station, and from water quality sampling would assist in the design of this program. As presently conceived, this pilot program could be expanded to cover the affected commercial project area. Surface water characteristics to be assessed include stream flow, sediment loads, runoff, and water quality. Water level, flow rates, and water quality could be determined for ground water. Depending upon data needs, the test mine hydrology field program would be expanded.

Amoco would also more fully define the chemical and physical characteristics of the mine waste and process waste. This information would be used in formulating wastewater treatment measures, protection measures for ground water against possible leachate contamination, and reclamation techniques. In addition, air and water monitoring programs would begin. Amoco would also continue with ecological baseline studies, identify probable impacts, formulate mitigation measures, and develop an approved reclamation and revegetation program.

CHEVRON-GNC

Chevron-GNC Energy Corporation (Chevron-GNC) proposes to convert one lease involving 160 acres (Map 1-2, map pocket of draft EIS). As shown in Chevron-GNC's proposed plan of operations (Chevron-GNC 1982), the tract would be mined and its ore processed by a cold water flotation/solvent extraction plant (with coking and hydrotreating facilities) capable of producing 10,000 bpd of synfuel.

Chevron's plan of operations proposes a three-stage development program—exploration, pilot plant and test mine, and commercial development. Figure 1-11 shows a general schedule.

Exploration

To evaluate the tar sand deposits, three core holes would be drilled within the conversion area. Access to the drill sites would be gained by building road spurs from the existing primitive road that crosses the northeast corner of the conversion area.

The drill sites would be prepared by leveling the ground to allow stable drilling, removing unconsolidated material (dirt) to the side of the area, and keeping material lost down slope to a minimum consistent with good engineering practice. Less than 0.25 acre would be disturbed for each drill site.

The length of access roads to the three drill sites would total 1,400 feet. Road locations have been selected from topographic maps. Where possible, roads have been aligned with ridge lines to avoid creating drainage channels and to avoid erosion caused by roads intercepting natural drainages. The roads would be 16 feet wide, and the material removed from the roadbeds would be placed on the outside edges of the roads to form safety berms and to control erosion. Water bars would be installed at reasonable intervals. Roads used during exploration would be maintained by blading. Roads no longer needed for exploration or mining would be reclaimed.

Roads and drill sites would be reclaimed by spreading the surface material removed during drill site and road building over the disturbed areas to provide a medium for plant growth. The regraded drill sites and roads would be seeded and mulched to establish plant cover.

Test Mine

Mining would occur in two phases. Because the tar sand outcrops on the conversion area, ore would be mined in several small areas to allow tar sand of different grades and sand layers to be extracted for processing. For the first phase, four workers at the mine would produce up to 40 tons of ore per day, mining up to 80 tons of rock, up to half of which would be overburden. This ore would be trucked to a pilot plant south of Sunnyside over the existing roads, improved to allow heavy traffic. The second phase would proceed as the first, but with increased tonnages.

Commercial Mine

The conversion area would be mined like a typical open pit mine. The mine would be accessed by a haul road from Chevron's interrelated mine on private land. The forest section of the ridge face to be mined and the areas set aside for spoiling waste rock would be cleared of all trees and brush. Topsoil would be removed and stored for reclamation use.

An estimated 210 million tons of waste rock would be removed from the conversion area to recover 200

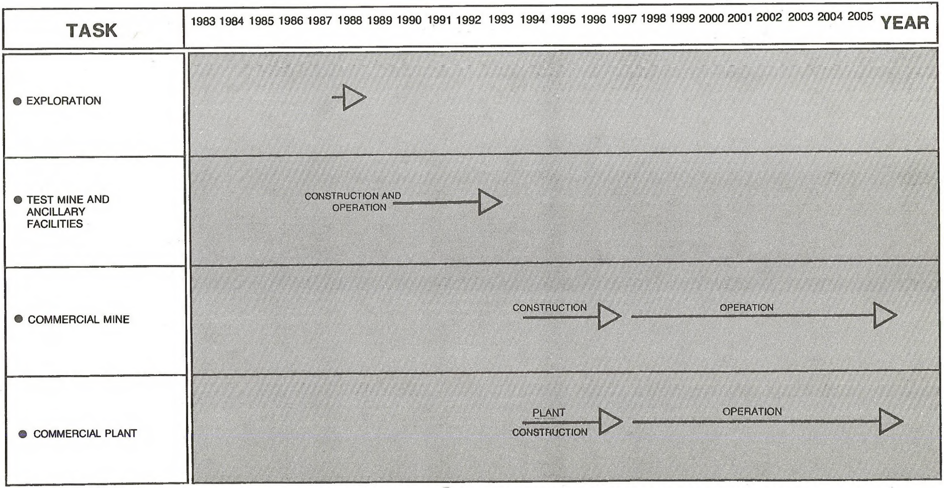


FIGURE 1-11 CHEVRON-GNC PLAN OF OPERATIONS SCHEDULE

million tons of ore. The waste rock is expected to be consolidated and would require blasting for removal. Large rotary blast hole drills would be used to open 12-inch-diameter blast holes along 50-foot-high mining faces. The explosive used in blasting would consist of a mixture of ammonium nitrate and fuel oil (ANFO).

Ore and waste rock would be loaded with 12-cubic-yard shovels and hauled in 85-ton haul trucks. At first, 65 million tons of waste rock would be placed in a canyon below the elevations of the tar sand horizons. This canyon is southwest of the mine area, on areas controlled by Chevron but not on the area to be converted. After mining year 7, waste rock would be backfilled into mined-out areas as the face is advanced.

With the open pit mining plan, several benches or levels would be active at any given time. The simultaneous mining of ore from several faces would aid in maintaining an average feed rate and grade for processing. The number of faces mined within the conversion area would be determined at a later date.

The ore would be drilled, blasted, and loaded at the mine site; moved to a primary crusher on the edge of the mine property; and crushed. Next, it would be fed into a grinding mill and slurry preparation plant in Whitmore Canyon and carried as a slurry via pipeline to the processing plant.

After the area has been mined, Chevron proposes to reclaim the flat, upper waste dump surfaces and the haul roads. The only areas suitable for topsoil salvage are on the upper portion of Patmos Ridge. Topsoil from these areas would be removed, stored, and ultimately used for waste dump and haul road reclamation.

Only small amounts of ground water seepage into the mine area are expected. Spring runoff and precipitation runoff would be directed to sedimentation ponds, which would periodically be cleaned. These ponds would be built below the dump toes in each of the canyons draining the mine area.

Pollutants expected to enter downstream water include total suspended solids and nitrates (from the blasting agent). Other pollutant increases are not now known. Before mining, more water quality information would be collected to serve as a base against which water quality monitoring data collected during mining could be compared.

Access to the mining area would be controlled by eliminating public access roads and trails other than roads used by operating personnel. Access roads would be secured by locked or guarded gates at all times.

During mining, an annual 50 acres of abandoned haul roads and completed waste dumps would be reclaimed. After salvaged topsoil from the mine is used for top dressing, the areas would be fertilized and seeded. During the life of the mine, a reclamation research program would be developed to study reclamation vegetation species, fertilization needs, and planting techniques. Proposed reclamation procedures are discussed in Appendix A-7, Reclamation and Erosion Control Programs.

Additional Environmental Protection Measures

In addition to the construction and operation procedures discussed in previous sections, Chevron-GNC is committed to the following environmental protection measures.

- No water used in processing tar sand or tar sand oil would be discharged to surface waters.
- Mill tailing disposal areas would be designed to minimize influence on ground water.
- Spill prevention and control plans would be developed to prevent loss of oil and fuels to surface waters.
- Water withdrawals would be adjusted and timed to avoid damage to fish.
- Wildlife in the area would be surveyed in cooperation with the Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service to identify sensitive wildlife populations.
- Archaeological, soil, and vegetation surveys and paleontological and mineable resource reviews would be conducted to develop plans for mitigation.

ENERCOR

Enercor plans to convert three leases totaling 1,962.67 acres. Their locations are shown on Map

1-2 (map pocket of draft EIS). The Enercor leases are discontinuous and scattered among the properties of other companies so that any major combined hydrocarbon lease holder would have difficulty operating a major commercial mining project without cooperation from neighbors. Enercor has participated in discussions concerning joint and cooperative resource development. Because no definite plans for cooperative effort have been completed, however, Enercor is prepared to carry out project development work by itself and has structured its proposed plan of operations accordingly.

As outlined in the proposed plan of operations (Enercor 1982), Enercor proposes to carry out its tar sand operation in five phases:

- *Evaluation of the tar sand resource and associated mining and milling potential*
- *Permitting and initial project engineering*
- *Detail design and building of the project*
- *Commercial production of bitumen from the leased resource in an initial production mode and then at full production*
- *Decommission (abandonment) and restoration*

Enercor has determined the specific details for the Phase I program. But because Phases II, III, IV, and V depend on the results of Phase I, Enercor has only outlined these phases conceptually. As information is gained from Phase I evaluation work, Phases II, III, IV, and V would be updated, and the proposed plan of operations would be amended. Figure 1-12 shows an expected schedule for the plan of operations.

Exploration

The exploration program would be carried out in five parts. Initial reconnaissance would consist of gathering information and conducting a literature search. Tar sand outcrops visible in the canyons would then be field mapped. The next step would be systematic drilling and development, recovering an estimated 12 drill holes, some temporary site preparation, and road work. Core samples would be taken and analyzed for bitumen, viscosity, sand properties, and trace elements. Next, a site would be selected for the mining of a bulk sample of tar sand ore (2,000 to 3,000 tons) for pilot plant testing and preliminary mining analysis. The site would have a minimum of overburden and would require the least possible amount of terrain disturbance.

Test Mine and Pilot Plant

An area of 1 to 2 acres is expected to be disturbed in mining the 2,000 to 3,000 tons of tar sand ore. Dozers and front-end loaders would move overburden and load 30-ton highway trucks with tar sand ore. The ore and overburden could require drilling and blasting before their removal or loading. Some road work, stream crossing improvement, and other temporary measures could be needed to facilitate the movement of ore trucks to and from the deposit.

The ore would be mined during the summer in dry weather in the least amount of time feasible (2 to 4 weeks).

Enercor has a pilot plant in Salt Lake City, which has been operated as a joint venture between Enercor and the State of Utah. The plant was built to process tar sand ore and recover clean bitumen of upgrading quality at a rate of 50 bpd.

This pilot plant would be used for a test program for Enercor's proposed Sunnyside development to process a 2,000- to 3,000-ton sample of tar sand ore. The pilot plant would be operated first in a test mode and then under full continuous operation at design rates (50 bpd bitumen production), using the Sunnyside ore as feedstock. Data from the test results would be used to design the full-scale commercial plant. Bitumen samples that could be evaluated in various upgrading processes would also be prepared. This work is expected to be done during a pilot plant operation period of 3 to 6 months.

Commercial Mine

The mine would be a typical surface mine as described in Section 1.C.1, General Plan of Operations. The mine area would include the mine, mine-related facilities, and primary crushing and tar sand handling systems that would carry the ore to the milling, processing, and upgrading facilities. Over the 20-year life of the mine, 3,000 acres would be disturbed, including disturbance from the proposed mine, canyon fill areas, and ancillary facilities (water pipeline, power transmission line, and roads).

Commercial Processing Plant

The commercial processing plant would be built on the valley floor, 3 to 4 miles east-southeast of the

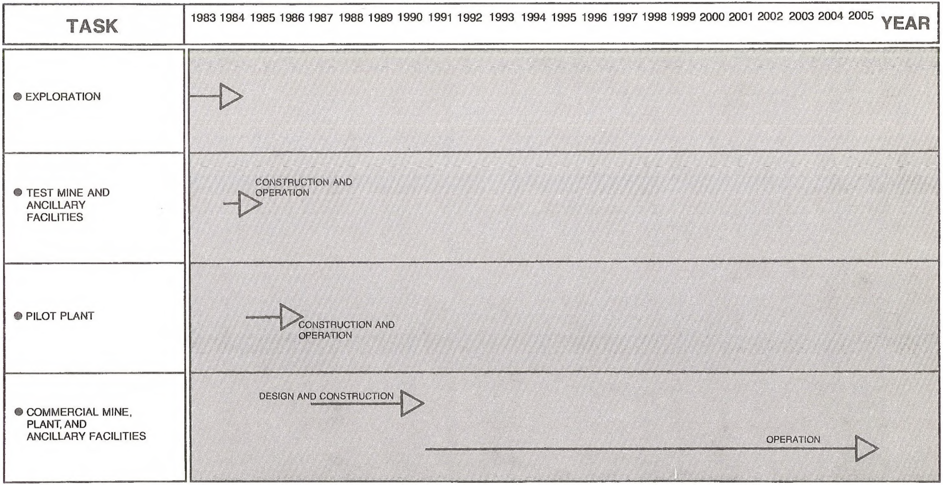


FIGURE 1-12 ENERCOR PLAN OF OPERATIONS SCHEDULE

mine; it would disturb 100 acres over the life of the project. The plant would use a typical hot water extraction process as described in Section 1.C.1, General Plan of Operations. At full production, the plant would have a 20,000 bpd capacity.

The ore would be carried from the mine to mill via a belt conveyor system following existing roads.

The sand from which the bitumen has been removed would be placed in a pile, covered with topsoil (removed before the sand laydown), and revegetated progressively as the spent sand is accumulated. The spent sand disposal pile would be designed for the use of tailings pond techniques so that any moisture drainage from the sand or surface runoff would be collected and the water recycled to the plant. Proposed reclamation procedures are discussed in Appendix A-7, Reclamation and Erosion Control Programs.

The upgraded oil would be carried to a market via pipeline. Ancillary facilities would consist of access roads, power lines, conveyors, a water pipeline, bitumen pipelines, and product pipelines.

Additional Environmental Protection Measures

Enercor has not committed to implementing any special mitigation measures.

MONO POWER COMPANY

Mono Power Company (Mono) plans to convert seven leases totaling 9,836.13 acres. These locations are shown on Map 1-2 (map pocket of draft EIS). Mono's plan of operations (1982) proposes to undertake the following activities to develop tar sand resources in the Range Creek and Whitmore Canyon areas:

- *Exploration and resource definitions*
- *Mine plan refinement*
- *Process definition and design*
- *Test mine and pilot plant operations*
- *Commercial mine and plant project*

The project development schedule is shown in Figure 1-13.

Exploration

Mono has completed some field mapping and drilled 31 exploration wells on its Sunnyside deposit. This exploration work has given Mono an initial estimate of the amount and quality of tar sand but does not provide a complete data base to base a project on. Mono has prepared the preliminary mining and project plans, which will be updated and refined as exploration and other activities continue.

Test Mine and Pilot Plant

The proposed plan of operations calls for tar sand to be mined first from the Whitmore Canyon area (section 24, T. 13 S., R. 13 E.) (Map 1-2, map pocket of draft EIS). (More pilot plant mines would be developed in the Range Creek area with their production rates being determined by Mono's ongoing exploration program.) The mining would be carried out on some 30 acres of Utah State mineral lease land and 80 acres of federal lease land in the southwest quarter of Section 24.

Once mined, the material would be carried down the Left Fork of Whitmore Canyon to a crushing station by a fleet of 13, 20-ton highway-type trucks. Once crushed, the tar sand material would be carried to a pilot plant near Sunnyside. The pilot plant would have a 250 bpd capacity to allow for the full-scale demonstration of the various process vessels and process ancillaries, which would allow testing of future commercial feasibility.

Commercial Mine

Commercial mining would occur at two sites—the Whitmore Canyon tract (sections 12, 13, 23, 24, 25 and 26, T. 13 S., R. 15 E.) and the Range Creek tract (sections 11, 12, 15 and 16, T. 14 S., R. 14 E.) (Map 1-2, map pocket of draft EIS). Tar sand ore would be extracted using open pit mining techniques at both tracts.

Before the overburden is removed, the area would be cleared of all woody vegetation. Merchantable timber would be salvaged. Other large trees in the area would be bulldozed into a pile and burned or placed in backfill areas in a manner consistent with regulations.

In the early stages of mine pit development, topsoil would be stockpiled for future reclamation use. As

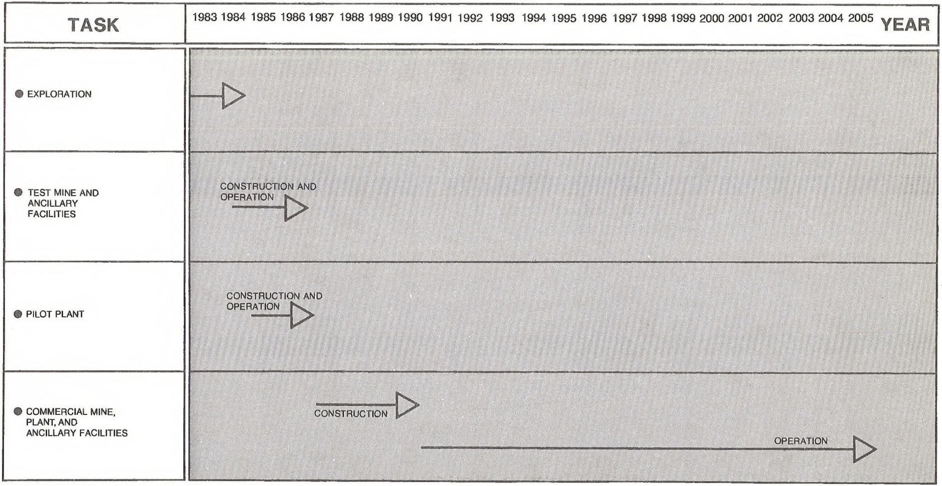


FIGURE 1-13 MONO PLAN OF OPERATIONS SCHEDULE

the sequence progresses, topsoil would be removed from the stripped area and immediately redistributed on the replaced overburden burning pit backfilling.

Overburden and interbedded waste would be drilled, blasted, and loaded into haul trucks with shovels and front-end loaders. The waste would be carried to disposal piles or backfill areas of the active pit.

Tar sand ore would be removed in the same manner as the overburden. The ore would be hauled to a primary crusher near the active pit, and crushed ore would be moved by conveyor to the extraction plant for processing.

Reclamation would be ongoing during the life of the mine. Additionally, overburden carried directly to pit backfill areas would be recontoured to be compatible with surrounding topography and drainage systems and would be seeded with species native to the area. Proposed reclamation procedures are identified in Appendix A-7, Reclamation and Erosion Control Programs.

Commercial Plant

The tar sand would undergo primary crushing at the mine site and would be carried via conveyor to the mill site in Section 17, T. 15 S., R. 15 E. (Map 1-2, map pocket of draft EIS) where the bitumen would be extracted. After extraction, the processed sand would be placed in a prepared disposal area west of the plant.

The bitumen would be carried via pipeline from the extraction plant to the upgrading plant. The upgrading process would produce a synthetic crude that would be carried from the upgrading plant via pipeline.

Ancillary facilities would consist of access roads, power lines, a water pipeline, conveyors, bitumen pipelines, and product pipelines.

Additional Environmental Protection Measures

1. As monitoring and ongoing studies identify impacts or a potential for impact, Mono has committed to using reasonable measures to mitigate impacts to the extent possible.

2. The following studies will be undertaken or are already underway to identify existing ground water and surface water characteristics:

   - Inventory water rights and users that might be affected

   - Inventory springs in the areas to be affected by mining

   - Assess the quantity of ground water exchange or reduction by surface stream segments

   - Installation of ground water monitoring wells to determine aquifer characteristics and to define problems of ground water movement

   - Conduct column leach studies on proposed sand and overburden waste materials to estimate potential chemical constituents of ground water percolating through reclaimed areas.

3. The following alternatives are being studied to address the mitigation of potential project-related impacts to the Sunnyside water resources.

   - Develop alternate water sources by providing increased capacity in supply lines to the mine facility from the proposed water supply for the tar sand development.

   - Enter cooperative agreements with Sunnyside and East Carbon to enhance existing water systems by developing poorer quality sources for irrigation within these towns, thereby reducing the demands on better quality water supplies and on water treatment facilities.

   - Enter cooperative agreements for the enhancement of water treatment and wastewater disposal facilities.

SABINE PRODUCTION COMPANY

Sabine Production Company (Sabine) proposes to convert five leases totaling 7,240.04 acres. Lease locations are shown on Map 1-2 (map pocket of draft EIS).

Sabine's proposed plan of operations (Sabine 1982) consists of four phases—exploration, development,

production, and reclamation. A general schedule is shown in Figure 1–14.

Exploration

The exploration phase would consist of two stages—definition and delineation. During the definition stage, about 22 core holes would be drilled; during the delineation stage, about 20 wells would be drilled. The areas of promise would be shown in the submission with a preliminary conclusion as to how the tar sand in each such area would be produced. Sabine would request approval for any location changes or more core holes needed to delineate tar sand areas.

Development

The development phase would consist of planning and securing approval for the production method, upgrading process, environmental protection, and the water supply and access, followed by building the bitumen processing facilities, drilling injection and producing wells, and installing surface facilities. This stage would require 3 years.

Although the plan of operations addresses only an in-situ operation for the conversion area, the type of in-situ process selected would depend upon the results of the exploration phase. Both thermal and solvent processes would be studied, but present knowledge suggests that a steam injection method would be most likely.

The development phase would overlap the production phase because some bitumen would be extracted before the completion of the facility. In the interim, bitumen would be stored in tanks.

Production

During production, crude bitumen could be extracted by injecting steam through injection wells into the tar sand, by extracting the heated (approximately 150°F) tar-water mixture through producing wells, and by separating the bitumen and recovered water. The bitumen then could be carried via pipeline to an off-site upgrading facility.

The wells would be drilled at a rate of 150 per year. Vertical drilling is expected for most areas, but horizontal drilling into the tar sand face exposed along the canyon walls might prove commercial in certain areas. Few, if any, of the wells planned for the production phase would be drilled below 1,000 feet, and all would be drilled sequentially in a continuous drilling program. Flowline and injection lines would be placed in corridors along the roads to the well patterns and would need little if any surface work for their installation.

Known data reveals that a steam injection process would likely be employed in standard spacing patterns. These patterns would be drilled outward onto the several plateaus from a central plantsite with the heat source and bitumen treating unit. The patterns would be drilled to the economic limit of the tar sand accumulation, as determined by exploration data. Tar sand with less than 36,000 barrels per acre in place is not expected to be commercially producible. Commercially producible deposits would have to be at least 30 feet thick for tar sand with 60 percent saturation and 25 percent porosity or 100 feet for tar sand with 30 percent saturation and 16.7 percent porosity. These saturation-porosity ranges are believed to cover the averages likely to be found in the proposed conversion area. As an extraction area is depleted (about 5 to 10 years), new wells would be drilled in nondepleted areas.

Sabine does not propose to exclude from development all acreage having less than 36,000 barrels per acre. Acreage containing 12,000 barrels per acre would be retained in the unit if, as expected, such acreage is contiguous with high in-place resources.

Individual extraction wells would have a smaller product pipeline feeding into the main line and would be equipped with a conventional pumping-jack type unit and a power supply line paralleling the pipelines.

The steam required for injection could be produced by burning coal. The main steam line leading to the extraction well area typically could be in the 12- to 18-inch-diameter range with smaller (2-inch-diameter) branch lines leading to individual steam injection wells. Since some of the condensed injection steam is recovered with the extracted tar-oil mixture and reused, about 5,000 acre-feet per year of make-up water would be needed for a 5,000 bpd operation.

The analysis assumed that 100 percent of the area proposed for in-situ development would be disturbed. The disturbance would be confined to the surface and near-surface, and no soil or overburden

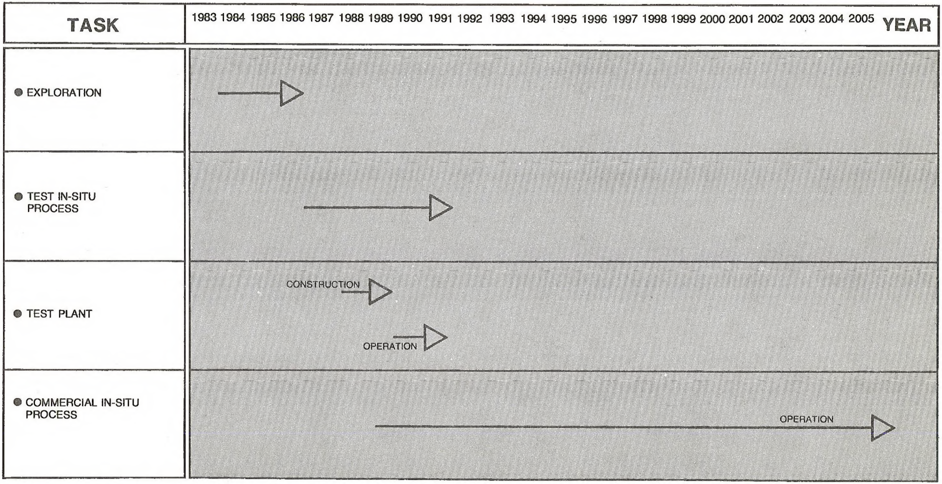


FIGURE 1-14 SABINE PLAN OF OPERATIONS SCHEDULE

would be removed. Of the 100 percent disturbance, the assumption was that 40 percent would be directly disturbed (graded) by construction of the actual recovery well facilities, including access roads and product pipeline systems. The remaining 60 percent would be indirectly disturbed through worker and off-road vehicle travel.

As bitumen recovery is completed in each pattern, wells within the pattern would be abandoned, and no equipment would be left above ground. Pipelines no longer needed for that pattern would be removed and any surface disturbance reclaimed. Upon completion of the last pattern, all pipelines would be removed and the heat-source and bitumen treating plants dismantled. The surface would be returned to as usable and as aesthetic a condition as possible. Proposed reclamation procedures are identified in Appendix A-7, Reclamation and Erosion Control Programs.

Ancillary facilities would consist of access roads, water pipelines, and a product pipeline.

Additional Environmental Protection Measures

Sabine has not committed to implementing any special mitigation measures.

1.C.3 ENERGY EFFICIENCY

Overall energy efficiency is defined as the net energy output divided by the net energy input times 100. Net energy outputs consist of the British thermal units (Btu's) contained in the products and by-products. Net energy inputs are more complex, but they can be broken down into sections, each of which can be dealt with separately and combined in various ways as needed. The major sections are as follows:

- Mining the tar sand
- Carrying the ore and other needed material such as water to the processing plant
- Processing the raw material, extracting, and upgrading
- Carrying the products, by-products, and waste products
- Indirect energy, which includes energy needed to produce the final products and equipment to do the job
- Infrastructure energy, which includes energy used by the employees of the project, their families, and secondary industries (including social services)

Little or no specific data on net energy requirements for tar sand projects exists in the literature. The net energy analyses summarized here only approximate the efficiency from the applicants' projects. Depending on the length of the ancillary facilities (roads and water and product pipelines), the efficiency of a particular project could vary by 4 percent.

The following calculation is for a tar sand project that includes a typical surface mine with average ancillary facilities and a typical 20,000 bpd processing plant. The energy content shown for energy inputs and output represents equivalent barrels of oil per day.

Net Usable Output		20,000 bpd
Input		
	Energy in Tar Sand Resource	26,000 bpd
	Other Fuels Used	2,000 bpd
	Indirect Energy	5,000 bpd
	Infrastructure	3,000 bpd
Total Input		36,000 bpd

$$\text{Percent Efficiency} = \frac{20,000}{36,000} \times 100 = 55.6\%$$

(including the energy in the tar sand)

Another way to view energy output is to disregard the energy in the tar sand. In such a case, for an investment of 10,000 bpd, the projects would yield 20,000 bpd, thereby making available 10,000 bpd of new or additional energy.

No information exists on in-situ process efficiencies but the percent recovery of the oil in place can be assumed to be fair to good (40 to 50 percent) and aboveground processing efficiencies can be assumed to be about the same as for the other processes. Estimated overall in-situ energy efficiency would thus amount to 20 to 30 percent.

The following table compares energy production from tar sand and other energy sources.

Type	Percent Efficiency
Oil From Tar Sand In-Situ	20 to 30
Shale Oil from an Underground Mine	30 to 40
Crude Oil to Petroleum Products	30 to 40
Electrical Power from Coal	
Strip Mines	33 to 43
Underground Mines	31 to 41
Uranium to Electricity	17 to 27
Electrical Power from Natural Gas	35 to 45
Oil from Tar Sand Strip Mines	45 to 55

Source: Energy analysis handbook for preparation of oil shale development environmental impact statements. Prepared by Bureau of Land Management, Colorado State Office. March 1982.

1.D PARTIAL CONVERSION AND/OR SPECIAL MITIGATION ALTERNATIVE

For ease of reference in this EIS, the title of this alternative has been shortened in text, tables, and maps to read only as the "partial conversion alternative," although this alternative involves conversion with stipulations to attain essentially the same environmental protection as the proposed actions.

This alternative would incorporate constraints to eliminate or reduce environmental land-oriented impacts. Such constraints could be achieved by partial conversion of leases (modified lease boundaries), total conversion of some leases, and denial of conversion on other leases or by special stipulations tailored to minimize surface disturbance (limited or no surface occupancy).

This alternative is based on assumptions (including production level, project components, and conventional operating procedures) that were developed by BLM for assessing potential impacts. This alternative is not proposed by any applicant.

The purpose of this alternative is to provide an assessment of the impacts of providing substantial protection to various resources. This alternative was also developed to allow the decision maker the option of "mixing and matching" development scenarios, depending upon environmental constraints.

The production level was developed without reference to any production plans by the applicants for the in-ground resource. Its sole purpose is to provide a midpoint for air quality and socioeconomic impacts, and it should not be used for assessing the benefits by barrels per day of production from this alternative.

Map 1-5 (map pocket of draft EIS) shows the areas assumed to be in this partial conversion alternative, and Table 1-5 gives the number of acres proposed for conversion in these areas.

The area included in the partial conversion alternative was determined on the basis of criteria

TABLE 1-5
ACRES OF APPLICANT-PROPOSED CONVERSION AREA INCLUDED IN PARTIAL CONVERSION ALTERNATIVE

Applicant	Area Included (acres)	Area Constrained or Excluded (acres)
Amoco	6,402	3,200
Chevron-GNC	0	160
Enercor	120	1,843
Mono	2,914	6,922
Sabine	5,410	1,830
Total	14,846	13,955

Note: See Map 1-5 (map pocket) for location of included areas.

designed to protect critical areas expected to undergo adverse impacts. These criteria are listed below. Although adverse impacts could occur to several resources not mentioned in the listed criteria (socioeconomics, air quality, transportation networks), these impacts cannot be reduced or eliminated by constraining specific areas from development on the basis of existing resource data.

1.D.1 Constraining Criteria

Any area that met one or more of the following criteria was designated a "critical area" and excluded from the partial conversion alternative. Unless cited otherwise, these criteria are based on the Federal Land Policy and Management Act.

- Areas where proposed land disturbance could violate Utah Department of Health standards for domestic water sources now used or having the potential to be used within the Sunnyside STSA (Grassy Trail Reservoir and Range Creek) (Public Law 294 and various orders of withdrawal). Areas meeting this criterion are labeled as critical areas on Map 3-1 (map pocket of draft EIS) and shown as eliminated areas on Map 1-5 (map pocket of draft EIS).

- Federal land where federally designated critical habitat for threatened or endangered plants or animals has been determined to be of essential value to the species by the Fish and Wildlife Service or the surface management agency and where the species' presence has been scientifically documented (Endangered Species Act of 1973, as amended). No areas within the main block of the Sunnyside STSA met this criterion, but no surveys for threatened or endangered species have been completed to date (July 1984).

- Federal land with an active bald or golden eagle nest, plus the necessary buffer zone around the nest site (Bald Eagle Protection Act of 1940 and Endangered Species Act of 1973, as amended). No areas within the main block of the Sunnyside STSA met this criterion, but no surveys for threatened or endangered species have been completed to date (July 1984).

- Federal land where the State of Utah and the surface management agency jointly agree that fish or wildlife habitat for resident species is of high interest to the state and essential for maintaining these priority wildlife species. Examples of areas that serve a critical function for species include active dancing or strutting grounds for grouse species, critical seasonal ranges for deer and elk, and migratory corridors for elk. Areas meeting this criterion are labeled as critical areas on Map 3-4 (map pocket of draft EIS) and are shown as eliminated areas on Map 1-5 (map pocket of draft EIS).

- Areas where proposed activities would permanently disrupt livestock trailing routes, grazing patterns (to the extent that an important area would be isolated), or important livestock watering sources. In addition, the loss of livestock watering sources could also harm wildlife that depend upon these sources for their well-being. Areas meeting this criterion are labeled as critical areas on Map 3-2 (map pocket of draft EIS) and are shown as eliminated areas on Map 1-5 (map pocket of draft EIS).

- Areas viewed from the valleys west and south of the STSA where proposed activities would cause visual contrasts that would not meet the objectives of the Visual Resource Management Class in which the area is located. Areas meeting this criterion are labeled as critical areas on Map 3-5 (map pocket of draft EIS) and are shown as eliminated areas on Map 1-5 (map pocket of draft EIS).

- Areas where projects would eliminate an essential public access route. No such areas were identified within the main block of the STSA.

- Areas where cultural resource disturbances could not be mitigated easily by recording or excavation (for example, trail rut, pictograph, petroglyph, or large site that would require a long period for excavation and artifact and data analysis) or areas that contain cultural resources eligible for inclusion on the National Register of Historic Places. No such areas were identified before the publication of this EIS, but when the report of the 1983 field season surveys is released (late summer 1984), areas meeting this

criterion may be identified. (National Historic Preservation Act of 1966 (No. USC 470) and Executive Order 11593 (36 FR 8921, May 1971)).

1.D.2 Production-Related Assumptions

The production-related assumptions for the partial conversion alternative were based on (1) the total acreage to be mined (as determined by the constraining criteria in the previous section) and (2) a decision to include an oil production level between production levels proposed by the applicants in their plans of operations and the production level assumed for the unitized development alternative. The assumptions were not based on plans proposed by the applicants.

Under partial conversion, the bitumen would be recovered from the tar sand underlying 14,846 acres. The EIS analysis assumed that for a given area, the same method of recovery would be used as proposed in the applicants' plan of operations but at a reduced rate. The analysis further assumed that the tar sand ore would be processed at one 75,000 bpd plant (with milling and upgrading facilities) to be centrally located near Sunnyside, Utah. Spent sand would be disposed of next to the plant. Bitumen extracted through in-situ recovery would be processed in a 5,000 bpd plant (with steam generation facilities) within the conversion area.

On the basis of an 80,000 bpd rate of processing and the area to be mined, the project life under this alternative was assumed to be 49 years. On the basis of reclamation sequence assumptions outlined for the proposed action in Section 1.C.2, Applicants' Plans of Operations, it was assumed that during steady-state, commercial-level operation, 5,000 acres of land would be out of productive use over a 25-year period.

Peak construction was assumed to require 1,880 workers and peak operation, 3,700 workers (Table 1-12, Section 1.H.1).

1.E UNITIZED DEVELOPMENT ALTERNATIVE

The unitized development alternative assumes that all the lease tracts proposed for conversion by the applicants would be approved, but that these tracts would be developed cooperatively rather than as separate operations as proposed in the applicants' plans of operations. Under this alternative, a logical mining sequence that ignores ownership boundaries would be used to maximize resource recovery. The mining sequence could be based on one or more unitized plans. It is assumed that the mining unit(s) would include all the applicants' proposed conversion areas plus the private land within the STSA that Chevron intends to mine. (Note that this mine is considered as an interrelated project for the proposed actions, partial conversion alternative, and no action alternative, but that the unitized development alternative is not directly comparable to any of these.)

All of the applicants have expressed interest in a unitized development and have agreed to discuss unitization at a later date. Sabine Corporation is assuming an active lead by circulating a draft unit agreement. This alternative is based on BLM assumptions and not on a specific plan proposed by the applicants or being considered by the proponents of Chevron's interrelated project.

This alternative assumed that for a given area, the same methods of tar sand recovery as proposed in an applicant's plan of operations would be used, but that recovery would occur at a reduced rate. The alternative further assumed that all tar sand ore mined within the STSA (recovered from the conversion areas and from Chevron's interrelated mine) would be processed at one plant (with milling and upgrading facilities) to be centrally located near Sunnyside, Utah. Bitumen extracted through in-situ recovery techniques would be processed at this plant. From discussions with industry representatives on a likely scenario for unitized development, the production level for the processing plant was assumed to be 50,000 bpd.

An operation of this size would need 7,140 acres for spent sand disposal. This alternative assumed that 3,500 acres next to the processing plant would be used for spent sand disposal. The remaining spent sand would be disposed of on 3,640 acres at some other undetermined location(s) in the Sunnyside area.

On the basis of a 50,000 bpd rate of processing and the area to be mined, project life under this alternative was assumed to be 94 years. From the reclamation sequence assumptions outlined for the proposed actions in Section 1.C.2, Applicants' Plans of

Operations, land disturbance was assumed to gradually increase to a steady-state, commercial-level operation, which would remove 3,500 acres from productive use at one time, continue for 60 years, and gradually decrease to the end of the project life.

Peak construction was assumed to require 475 workers, and peak operation, 2,465 workers (Table 1-12, Section 1.H.1).

1.F NO ACTION ALTERNATIVE

The no action alternative would involve denial of all the requested lease conversions. Since the filing of the conversion applications, the primary termination dates of 18 of the oil and gas leases in question have been suspended until decisions on the requested conversions have been made. The five other leases in question have still not expired.

A decision not to convert would result in ter minating the 18 leases (25,462 acres) whose terms have been suspended. The other five leases (3,339 acres) would remain in effect and could be extended beyond the normal termination date by timely drilling under the oil and gas regulations.

No action assumed that tar sand would not be developed on federal land within the STSA. If the environmental impacts of tar sand development are considered too adverse to permit converting the applicants' leases, potential adverse impacts could also be considered too great to offer new federal combined hydrocarbon leases in the area. No action, however, assumed that the interrelated projects would be developed as now envisioned (Section 1.A.5, Interrelationships). Under these assumptions, Chevron's interrelated mine on private land and the associated processing plant would be the only tar sand operation within the STSA.

1.G ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

No site-specific alternatives were eliminated from detailed analysis. As long as a lease conversion applicant provides the data required by the Combined Hydrocarbon Leasing Act and BLM lease conversion regulations, BLM cannot discount the validity of an application. These applications must be treated at face value and the NEPA process followed. The contents of each application represent the applicants' intention to carry out diligent development. Such alternatives to tar sand development as conservation or solar energy are not considered in this EIS but are addressed in the Utah Combined Hydrocarbon Regional EIS (BLM 1983a), which discusses the entire federal tar sand program.

1.H DATA SUMMARY

Tables 1-6 through 1-12 provide a data summary of the proposed actions and alternatives, based on the applicants' proposed plans of operations and the analysis assumptions outlined in Sections 1.C through 1.F. Information in these tables include tar sand mined; water use (proposed actions and alternatives); total area disturbed, removed, and reclaimed (proposed actions); total area disturbed by project component (proposed actions and alternatives); and annual construction and operation work force requirements (proposed actions and alternatives). The no action alternative is considered in accordance with regulations of the Council on Environmental Quality and the National Environmental Policy Act. It is a valid alternative to be considered in decision making.

A new estimate in the work force for Amoco was provided too late to be included in the analysis (see Section 3.A.2, Socioeconomics) but will be considered in future National Environmental Policy Act documents.

TABLE 1-6
TAR SAND MINED[a]
(Proposed Actions)

	TEST MINE			COMMERCIAL MINE		
Applicant	**Tons/ Year**	**Life (Years)**	**Tons Total**	**Tons/ Year (millions)**	**Life (Years)**	**Tons Total (millions)**
Amoco	150,000	1	150,000	105	30	3,150
Chevron-GNC	132,500	1	132,500	7.4	30	222.0
Enercor	3,000	1	3,000	18	20	360
Mono	246,750	1	246,750	26.8	33	884.4
Sabine	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
Collective Total	532,250	NA	532,250	157.2	NA	4,616.4
Interrelated Total	—	—	—	7.4	30	222.0
Cumulative Total	532,250	NA	532,250	164.6	NA	4,838.4

Note: NA = not applicable.
[a]Includes ore only, not tons of overburden.
[b]In-situ extraction proposed.

TABLE 1-7
WATER USE
(Proposed Actions)

	Exploration		Test Mine and Pilot Plant		Commercial Operation	
Applicant	**ac-ft/yr**	**Source**	**ac-ft/yr**	**Source**	**ac-ft/yr**	**Source**
Amoco	1	South Spring/ Range Creek	46	Price River	12,000	Price River
Chevron-GNC	1	East Carbon City	46	Surface	4,500	Price River
Enercor	1	Range Creek	12	Town of Salt Lake	5,000	Range Creek
Mono	1	Surface	4	Town of Sunnyside	9,345	Green River
Sabine	1	Surface (Co. owned pond)	1,000	Green River	5,000	Green River
Collective Total	5	Surface	1,108	Various	35,845	Various
Interrelated Total	1	Surface	45	East Carbon City	4,500	Various
Cumulative Total	6	Surface	1,153	Various	40,345	Various

Note: ac-ft/yr = acre-feet per year.

TABLE 1-8
WATER USE (ac-ft/yr)
(Alternatives)

Alternative	Collective Use[a]	Cumulative Use[b]
Partial Conversion	20,738	25,238
Unitized Development	14,340	18,840
No Action	None	4,500

Note: ac-ft/yr=acre-feet per year.

[a]Conversion-related use.

[b]Conversion-related use plus interrelated project use.

TABLE 1-9
TOTAL AREA DISTURBED, REMOVED, AND RECLAIMED (acres)
(Proposed Actions)

	EXPLORATION			OPERATION[a]					
				Applicants' Plans of Operations			EIS Assumptions		
Applicant	Disturbed	Removed	Reclaimed	Disturbed	Removed	Reclaimed	Disturbed	Removed	Reclaimed
Amoco	13	0	13	5,480	110	5,370	12,082	110	11,972
Chevron-GNC	4	0	4	325	170	155	325	170	155
Enercor	10	0	10	3,000	100	2,900	3,000	100	2,900
Mono	18	0	18	7,614	257	7,357	14,403	257	14,146
Sabine	21	0	21	6,135	45	6,090	6,135[b]	45	6,090
Collective Total	66	0	66	22,554	682	21,872	35,945	682	35,263
Interrelated Total	20	0	20	2,900	200	2,700	2,900	200	2,700
Cumulative Total	86	0	86	25,454	882	24,572	38,845	882	37,963

Note: Disturbed refers to total area that would be disturbed during construction and operation.

Reclaimed refers to total area that would be reclaimed during the life of the projects, including rights-of-way disturbance and spent sand disposal areas.

Removed refers to total area that would be occupied by surface facilities for the life of a project. Prior to project abandonment, the surface facilities would be removed and the disturbed acres reclaimed (with the possible exception of some roads that would be retained within the county network).

[a]The differences between the applicants' proposed plans of operations and EIS assumptions are explained in Section 1.C.2, Applicants' Plans of Operations.

[b]100 percent disturbance figure includes 40 percent primary disturbance plus 60 percent secondary disturbance. For more information regarding disturbance, refer to Section 1.C.2.

TABLE 1-10
TOTAL AREA DISTURBED BY PROJECT COMPONENT (acres)
(Proposed Actions)

	APPLICANTS' PLANS OF OPERATIONS[a]							EIS ASSUMPTIONS[a]						
	SURFACE MINE				IN-SITU			SURFACE MINE				IN-SITU		
Applicant	Mine	Plant	Spent Sand	Ancillary Facilities	Well Field/ Plant	Ancillary Faciltiies	TOTAL	Mine	Plant	Spent Sand	Ancillary Facilities	Well Field/ Plant	Ancillary Facilities	TOTAL
Amoco	3,000	110	1,500	870	—	—	5,480	9,602	110	1,500	870	—	—	12,082
Chevron-GNC	155	0	0	170	—	—	325	155	0	0	170	—	—	325
Enercor	1,500	100	1,000	400	—	—	3,000	1,500	100	1,000	400	—	—	3,000
Mono	4,510	57	2,177	870	—	—	7,614	9,836	57	3,640	870	—	—	14,403
Sabine	—	—	—	—	6,000	135	6,135	—	—	—	—	6,000	135	6,135
Collective Total	9,165	267	4,677	2,310	6,000	135	22,554	21,093	267	6,140	2,310	6,000	135	35,945
Interrelated Total	1,400	200	1,000	300	0	0	2,900	1,400	200	1,000	300	0	0	2,900
Cumulative Total	10,565	467	5,677	2,610	6,000	135	25,454	22,493	467	7,140	2,610	6,000	135	38,845

[a]The differences between the applicants' proposed plans of operations and EIS assumptions are explained in Section 1.D.2, Applicants' Plans of Operations.

TABLE 1-11
TOTAL AREA DISTURBED BY PROJECT COMPONENT (acres)
(Alternatives)

	SURFACE MINE				IN-SITU		
Alternative	Mine	Plant	Spent Sand	Ancillary Facilities	Well Fields/ Plant	Ancillary Facilities	Total
Partial Conversion							
Collective Total	9,436	262	4,355	1,720	5,410	135	21,318
Interrelated Total	1,400	200	1,000	300	0	0	2,900
Cumulative Total	10,836	462	5,355	2,020	5,410	135	24,218
Unitized Development	22,493	467	7,140	2,610	6,000	135	38,845
No Action							
Collective Total	0	0	0	0	0	0	0
Interrelated Total	1,400	200	1,000	300	0	0	2,900
Cumulative Total	1,400	200	1,000	300	0	0	2,900

TABLE 1-12
ANNUAL CONSTRUCTION AND OPERATION WORK FORCE REQUIREMENTS
(Proposed Actions and Alternatives)

	CONSTRUCTION		OPERATION	
	Year	Personnel	Year	Personnel
PROPOSED ACTIONS				
Amoco	1995	475	2003	2,465
Chevron-GNC	1994	2,000	1995	380
Enercor	1990	2,500	1991	800
Mono	1987	1,892	1989	1,230
Sabine	1988	60	1988	35
Peak Requirements	1989	3,810	2003	4,910
PARTIAL CONVERSION				
Surface Mining	1987	1,847	2003	3,660
In-Situ	1988	60	1988	35
Peak Requirements	1987	1,877	2003	3,695
UNITIZED DEVELOPMENT				
Peak Requirements	1994	475	2003	2,465

CHAPTER 2

COMPARATIVE ANALYSIS

CHAPTER 2
COMPARATIVE ANALYSIS

Chapter 2 compares the impacts of the proposed actions to three alternatives: the partial conversion and/or special mitigation alternative, the unitized development alternative, and the no action alternative. For a description of the proposed actions, see Chapter 1.

Table 2–1 compares and summarizes the environmental impacts of the proposed actions and alternatives. The comparative analysis is based on the impact analysis and significance criteria in Chapter 3 and on information in Chapter 4. Resource specialists projected the impacts detailed in Chapter 2 using a worst-case analysis, which assumed that all portions of the proposed conversion area would be disturbed to varying degrees. The degree of disturbance would range from open pit mining and vegetation removal to vehicles crushing vegetation on travelways.

TABLE 2-1
SUMMARY COMPARISON OF IMPACTS OF THE PROPOSED ACTIONS AND ALTERNATIVES

	Proposed Actions			Partial Conversion			Unitized	No-Action
	Collective	Interrelated	Cumulative	Collective	Interrelated	Cumulative		
Mineral Resources								
Total Production (b/bbl)	2.6	.2	2.8	1.1	.2	1.3	1.6	.2
Oil Production (bpd)	115,000	10,000	125,000	80,000	10,000	90,000	50,000	10,000
Conversion Related Processing Plants (number)[a]	5+2	1	6+2	2	1	3	1	1
Land Disturbance								
Total Disturbance (acres)[b]	35,945	2,900	38,845	21,318	2,900	24,218	38,845	2,900
Disturbed at any one time (acres)[b]	6,500 for 40 years	550 for 25 years	6,500 for 40 years with 7,050 peak	5,000 for 25 years	550 for 25 years	5,000 for 25 years with 5,550 peak	3,500 for 60 years	550 for 25 years
Project Life (years)[c]	74	35	74	49	35	49	94	35
Water Resources								
Water Use (ac-ft/yr)	35,845	4,500	40,345	20,738	4,500	25,238	18,840	4,500
Special Watershed Management Areas (acres)	3,960	2,560	6,520	1,280	2,560	3,840	6,520	2,560
Springs Affected	37	8	45	16	8	24	45	8
Potential to Exceed State Water Quality Standards	high	high	high	moderate	moderate	moderate	high	low
Socioeconomics								
Steady-state operation population increase, year 2005	23,610	21,260	44,870	17,840	21,260	39,100	12,140 (31,300)[d]	21,260
Employment	9,710	8,940	18,650	7,360	8,940	16,300	4,930 (12,990)[d]	8,940
Local Government Finances (percent of excess of costs over revenues)	*	*	20	*	*	19	18	*
Soils and Vegetation								
Disturbance in Climatic Zone B (acres)	0	1,000	1,000	0	1,000	1,000	6,820[e]	1,000
Disturbance in Climatic Zone C (acres)	1,838	200	2,038	4,141	200	4,341	267	200
Disturbance in Very Steep Terrain (acres)	26,172	1,223	27,395	10,722	1,223	11,945	21,862	1,223
Wildlife								
Mule Deer Herd (total acres of habitat lost)	32,296	1,400	33,696	21,318	1,400	22,718	33,696	1,400
Unit 27B Reduction (percent of herd)	12	1	13	8	1	9	13	1

TABLE 2-1 (Continued)
SUMMARY COMPARISON OF IMPACTS OF THE PROPOSED ACTIONS AND ALTERNATIVES

		Proposed Actions			Partial Conversion			Unitized	No-Action
		Collective	Interrelated	Cumulative	Collective	Interrelated	Cumulative		
Air Quality									
Potential Maximum Average Concentrations									
PSD Increments Class II ($\mu g/m^3$)									
SO_2 3-hour	512	exceed	not exceed	exceed	exceed	not exceed	exceed	not exceed	not exceed
24-hour	91	exceed	not exceed	exceed	exceed	not exceed	exceed	exceed	not exceed
Annual	20	not exceed	not exceed	not exceed	exceed	not exceed	exceed	not exceed	not exceed
TSP 24-hour	37	exceed	exceed	exceed	exceed	exceed	exceed	exceed	exceed
Annual	19	exceed	exceed	exceed	exceed	exceed	exceed	exceed	exceed
NAAQS ($\mu g/m^3$)									
SO_2 3-hour	1,300	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed
24-hour	365	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed
Annual	80	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed	not exceed
TSP 24-hour	150	exceed	exceed	exceed	exceed	exceed	exceed	exceed	exceed
Annual	60	exceed	not exceed	exceed	exceed	not exceed	exceed	exceed	not exceed
NO_2 Annual	100	exceed	not exceed	exceed	exceed	not exceed	exceed	not exceed	not exceed
Transportation									
Total Vehicle Trips Per Day		Many road segments exceed the level of service C.	Few road segments exceed the level of Service C.	Same as Collective	NA	Few road segments exceed the level of service C.	Same as Interrelated	Few road segments exceed the level of service C.	NA
Tonnage Transported By Railroad Spur (million gross tons)		Exceeds Capacity	Exceeds Capacity	Exceeds Capacity	Does Not Exceed Capacity	Exceeds Capacity	Exceeds Capacity	Exceeds Capacity	Exceeds Capacity
Visual Resources									
Significantly Affected Class II Area (acres)		18,932	1,400	20,332	9,716	1,400	11,116	20,332	1,400
Significantly Affected Class III Area (acres)		7,268	0	7,268	3,568	0	3,568	7,268	0
Significantly Affected Class IV Area (acres)		4,050	1,200	5,250	4,827	1,200	6,027	5,250	1,200
Undetermined (acres)		2,445	300	2,745	1,855	300	2,155	2,745	300
Agriculture									
Grazing Loss (AUMs/year)		387	22	409	279	22	301	344	22
Cropland Converted to Urban Use (acres)		933	UNK	UNK	699	UNK	UNK	475	UNK
Number of Allotments Affected		12	0	12	6	0	6	6	0
Wilderness									
Impacts to the wilderness resource and quality of the wilderness experiences in Desolation and Turtle Canyon WSAs		Effects on trout in Range Creek (naturalness-wilderness value)	None	Slightly greater than collective	Minimal	None	Minimal	Same as Proposed Action	None

TABLE 2-1 (Concluded)
SUMMARY COMPARISON OF IMPACTS OF THE PROPOSED ACTIONS AND ALTERNATIVES

	Proposed Actions			Partial Conversion			Unitized	No-Action
	Collective	Interrelated	Cumulative	Collective	Interrelated	Cumulative		
Recreation								
Impacts to the recreation land base and quality of recreation experiences in Carbon and Emery Counties, Utah	Based on population increases and increased access, overall recreation quality diminished (i.e., scenic quality, naturalness, semi-primitive experience); elimination of a portion of the Green River as a potential Wild and Scenic River	Same as Collective	Same as Collective but of greater magnitude	Less impact to overall recreation quality due to no lease activity at Bruin Point and Range creek Elimination of a small portion of the Green River as a potential Wild and Scenic River	Same as Collective	Same as Collective but of greater magnitude	Less impacts to big game hunting quality due to fewer acres disturbed at any one time and less project-induced population growth	None

Note: ac-ft/yr = acre-feet per year; AUM = animal unit month; b/bbl = billion barrels; D&RGW = Denver and Rio Grande Western Railroad NA = not applicable $\mu g/m^3$ = micrograms per cubic meter UNK = unknown.

*Unknown at this time; data will be provided in the Final EIS.

[a]Each applicant has proposed 1 main plant. In addition, Mono has proposed 2 secondary mill sites.

[b]Disturbed refers to total area that would be disturbed during construction and operation.

[c]Project life refers to the total years that would be required for construction, operation-production, abandonment, and reclamation.

[d]Figures in parentheses represent cumulative impacts of the unitized development alternative plus the interrelated coal mines.

[e]More spent sand disposal areas located outside the STSA boundary.

2.A PROPOSED ACTIONS

The proposed actions consider the greatest conversion acreage and the most processing plants operating over a moderate period of time. The partial conversion alternative considers the least conversion acreage, a reduced number of processing plants, and a shortened period of commercial operation.

The unitized development alternative considers the greatest conversion acreage but assumes the longest commercial operation period because only one processing plant is involved. Figure 2-1 shows significant differences in land disturbances among the proposed actions and alternatives.

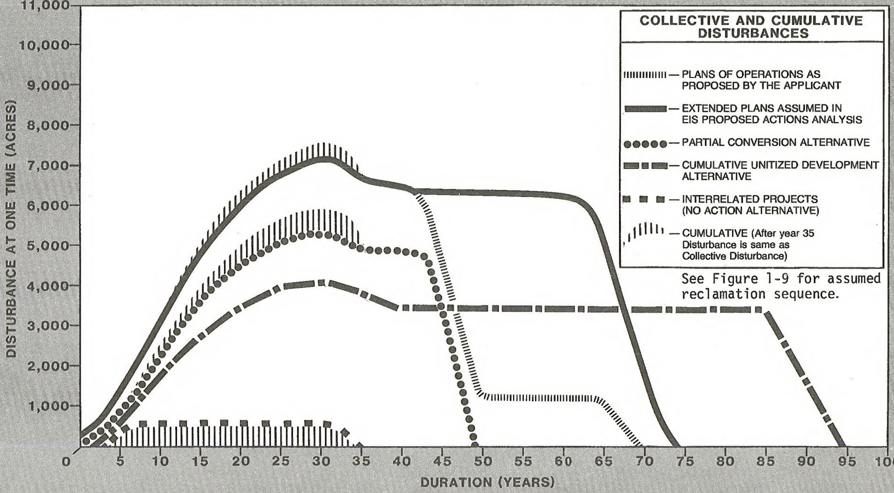


FIGURE 2-1 COLLECTIVE AND CUMULATIVE LAND DISTURBANCE

2.B PARTIAL CONVERSION AND/OR SPECIAL MITIGATION ALTERNATIVE

The partial conversion alternative assumes that only a portion of the leases would be approved for conversion. Actual tar sand development would proceed as proposed under the five plans of operations but only on leases approved for conversion. Thus, only 80,000 barrels per day (bpd) of crude oil equivalent would be produced. Project life would be 49 years instead of 74 years as under the proposed actions, allowing for production of 1.1 billion barrels, which represents 31 percent of the estimated available resources in the Sunnyside Special Tar Sand Area (STSA) as compared to 74 percent for the proposed actions. The conversion area tar sand would be processed in two processing plants instead of five, as described in Chapter 1.

The partial conversion alternative would disturb fewer acres than would the proposed actions, and disturbance would occur over a shorter period of time. Only an average of 5,000 acres would be disturbed at any one time during steady-state commercial operations. Partial conversion would also have fewer adverse impacts to soils, vegetation, wildlife, recreation, wilderness study areas, visual resources, agriculture, paleontology, and cultural resources than would the proposed actions. This alternative would cause less adverse impacts to grazing by excluding surface mining on critical grazing areas and areas around critical livestock waters.

Adverse impacts to watersheds would be significantly lower under this alternative than under the proposed actions because leases in portions of Grassy Trail Creek and Range Creek watersheds would not be converted. Both of these watersheds are used or have the potential for use as culinary water. Under partial conversion, the quality of the water in these watersheds would not deteriorate to any great extent.

Partial conversion would result in greater SO_2 and TSP concentrations in the air than would the proposed actions. SO_2 concentrations would be higher because of higher production levels at the stack, which gives the greatest concentration value. TSP concentrations would be higher because of mines producing at higher rates. The STSA would remain a non-attainment area, exceeding National Ambient Air Quality Standards (NAAQS) for total suspended particulates (TSP) and nitrogen dioxide (NO_2) for the life of the projects, similar to conditions under the proposed actions.

Partial conversion would have fewer socioeconomic impacts than would the proposed actions because partial conversion would need a slightly smaller labor force. In addition, transportation networks would be less affected.

2.C UNITIZED DEVELOPMENT ALTERNATIVE

The unitized development alternative assumes that all of the leases applied for conversion under the proposed actions would be approved but that the actual rate of tar sand development would be reduced. Instead of producing 115,000 bpd of crude oil under the five plans of operations, unitized development would produce only 50,000 bpd of crude oil. Unitized development would have a projected project life of 94 years (as compared to 74 years for the proposed actions), allowing for 1.6 billion barrels of production on 46 percent of available resources in the STSA. The recovered tar sand would be processed in one processing plant, as described in Chapter 1.

The total acres disturbed within the STSA as a result of this alternative would be the same as the proposed actions; however, the disturbance would occur over a longer time. Only 3,500 acres on the average would be disturbed at any one time during steady-state commerical operations. Consequently, the environmental impacts associated with land disturbance would be significantly less than the proposed actions at any one time. Even though more acreage of land disturbance would occur in Climatic Zone B (refer to Section 3.A.3, Soils and Vegetation for a description of climatic zones and Map 3-2, map pocket, for location) (spent sand disposal areas), the impacts to soils and vegetation would be less, as fewer acres would be disturbed at any one time. This would leave less area subject to a high erosion hazard, allow for more successful reclamation and reduce the size of area that would be out of vegetative production when compared against the proposed actions. The same holds true for wildlife. A smaller percentage of the wildlife species present would be affected at any one time. Mitigation measures described in Chapter 4 would reduce impacts to wildlife for the same time periods as for the proposed actions. However, because fewer acres would be disturbed at any one time (3,500 acres versus 6,500) the degree of impact would be somewhat less. The recreation activities associated with big game hunting would be affected to a slightly less degree. The total impacts to these resources over the life of the projects would be the same as the proposed actions, because the total acres disturbed would be the same.

There would be no significant difference in impacts to wilderness study areas, agriculture, paleontology, or cultural resources resulting from this alternative as from the proposed actions. For these resources, the greatest impact would be from total land disturbance which would be the same as the proposed actions.

The impacts to watersheds are expected to be similar for the unitized development alternative to those for the proposed action; however, these impacts would occur over a longer period of time and would be slightly less in magnitude. As a result, the aggregate impacts would be theoretically less, rather than measurably less.

The impacts to air quality would be slightly less than for the proposed actions. The surrounding air pollutant concentrations would be less and the impact area smaller, because less tar sand would be mined per year and only one processing plant, producing at a lower rate, would be in production. The Sunnyside STSA would remain a non-attainment area (exceeding NAAQS) for the life of the projects, similiar to the proposed actions.

The socioeconomic impacts to the area would be less than the proposed actions as the labor force needed to mine and operate a unitized development would be less. The smaller labor force would cause fewer impacts to transportation services and have a lower projected accident rate. In addition, impacts from increased tonnage transported would be less, as there would be less tar sand mined per year than the proposed actions.

The impacts to visual resources resulting from this alternative would be similiar to those for the proposed actions. Because of a unitized mining plan, the short-term pattern of disturbance would be an advancing front rather than small patches from several concurrent projects. The long-term impacts are expected to be essentially the same.

2.C NO ACTION ALTERNATIVE

The no action alternative would involve denial of all the requested lease conversions. It is assumed that no tar sand development would occur on federal lands within the Sunnyside STSA. The impacts to water, soils, vegetation, wildlife, visual resources, air quality, socioeconomics, transportation networks, cultural resources, and agriculture would be less than for the proposed actions. The only tar sand development would be from interrelated projects that would produce the equivalent of 10,000 bpd of crude oil. This would represent approximately .2 billion barrels, or 6 percent of the resources estimated to occur in the STSA.

CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3 discusses the affected environment and environmental consequences (commonly referred to as impacts) of implementing the proposed actions and alternatives.

The affected environment consists of the baseline conditions, assuming normal growth and changes that are occurring in the Sunnyside area, that would be affected by the applicants' proposed actions. The extent of the affected environment for individual environmental elements varies, depending on the impacts.

Resource specialists projected the impacts detailed in Chapter 3 using a worst-case analysis, which assumed that all portions of the proposed conversion area would be disturbed to varying degrees. The degree of disturbance would range from open pit mining and vegetation removal to the vehicle crushing of vegetation on travelways.

The level at which impacts are discussed depends on the degree or severity of impact. Significant impacts are discussed in detail, and insignificant impacts are summarized. Impacts are analyzed only for the commercial phase of development because exploration phase would not significantly affect the environment. Moreover, the test mine and pilot plant phase would be temporary, and their impacts would be encompassed by the impacts of commercial development.

The impact analysis presented in this EIS assumes that certain types of mitigation would be implemented and would alleviate or lessen adverse impacts. These types of mitigation include the following.

- Mitigation measures incorporated in the applicants' proposed plans of operations, which are committed to by the applicants and are described in Section 1.C.2.

- Mitigation measures enforceable on BLM-administered lands, which are part of existing oil and gas leases, and other measures that are typically required for projects like those analyzed in this EIS. BLM is committed to these measures, which are described in Appendix A-3. These mitigation measures may vary from one lease to another. These differing measures will be based on combined information from the collective impact analysis, the partial conversion alternative analysis, Appendix A-2, and the BLM land use plan leasing category determinations.

- Many laws and regulations administered by other federal agencies and by state and local agencies would apply to the proposed actions analyzed in this EIS. The major laws and regulations enforced by the State of Utah are described in Appendix A-3. Potential violations of laws that have identified standards cannot be determined until more detailed project data is known and the permit is applied for. Therefore, the analysis does not assume that the law will prevent an impact from occurring, since conditions at the time of future permit applications are unknown. Instead, the analysis focuses on known project detail and attempts to identify potential violations for consideration by the decision maker and applicants.

The impact analysis is also based on assumptions in Chapter 1.

3.A PROPOSED ACTION

3.A.1 Water Resources

IMPACT SIGNIFICANCE CRITERIA

Impact significance criteria for water resources are based on the Standards of Water Quality for the State of Utah, described in Appendix A-5, Water Resources. Impacts to water resources are considered significant (1) if the water resources would be changed so that they could no longer serve their existing function or (2) if Utah water quality standards are expected to be violated. Impacts are also considered significant if they would cause a salinity increase in the Colorado River system.

SETTING

The Sunnyside Special Tar Sand Area (STSA) lies in the headwaters of Grassy Trail, Range, and Nine Mile creeks and several tributaries that drain directly into the Green River. These headwaters nourish streams with high-quality water, some of which support cold water fisheries and are suitable for culinary use with little treatment. Table 3-1 summarizes the characteristics, of these watersheds.

Map 3-1, Water Resources (map pocket of draft EIS), shows the locations and characteristics of each watershed. The legend, however, is incorrect in showing all springs as being affected by the projects. Instead the legend should show only the locations of springs.

TABLE 3-1
SUMMARY OF WATERSHED CHARACTERISTICS

	WATERSHED				
Characteristics	**Grassy Trail Creek**	**Range Creek**	**Nine Mile Creek**	**Green River Tributaries**	**Total**
Tributary to	Price River	Green River	Green River	Green River	NA
Acres of Main Block of STSA Drained	15,592	11,769	47,076	23,539	97,976
Acres of Public Water Reserve	760	0	2,920	0	3,680
Acres of Water Supply Reserve	45	2,201	116	38	2,400
Number of Springs[a]	23	3	85	35	146
Use Designation Class[b]	1C, 3A, 4	1C, 3A, 4	3A, 4	1C, 2B, 3B, 4	NA
Acres of Special BLM Watersheds					
Bear and Rock Creeks	NA	NA	NA	1,960	1,960
Jack Creek	NA	NA	NA	1,266	1,266
Range Creek	NA	1,442	NA	NA	1,442
Acres Covered by Disposal Areas	1,000 (Chevron) 1,000 (Enercor) 1,327 (Mono)	750 (Amoco) 850 (Mono)	750 (Amoco)	0	5,677

Note: NA = not applicable.
[a]Number of springs determined from maps on file at the Price River Resource Area office.
[b]See Appendix A-5, Water Resources, for a description of Use Designation Classes and special watershed management areas.

GRASSY TRAIL CREEK WATERSHED

Grassy Trail Creek watershed has steep slopes and a deeply incised stream system that can rapidly move water out of the headwaters. It is also in an area of relatively high precipitation. Grassy Trail Creek drains 15,592 acres of the main block of the STSA and is a tributary to the Price River. Its watershed contains 760 acres of public water reserve and 45 acres of water supply reserve. (For a description of these special watershed management areas, see Appendix A-5, Water Resources.) This watershed also has 23 springs and supports a brown and rainbow trout fishery.

On Grassy Trail Creek and just outside the STSA is Grassy Trail Reservoir. Built as a joint venture of U.S. Steel and Kaiser Steel in 1952, it was used as a source of process water and as a municipal water supply for the company town of Sunnyside. The 991-acre-feet (ac-ft) reservoir now supplies water to Sunnyside and other downstream communities, storing water that needs only chlorination for culinary use. A recognized problem in this watershed however, is sedimentation. Utah Division of Wildlife Resources (UDWR) measurements show that Grassy Trail Reservoir contains 200 ac-ft of sediment, which has been accumulating at a rate of 6.67 acre-feet per year (ac-ft/yr).

Proposed for this watershed but downstream and outside the STSA are three spent sand disposal areas totaling 3,327 acres. This watershed has Use Designation Classes 1C, 3A, and 4 (Appendix A-5, Water Resources).

The potential exists for the applicants' proposed developments to collectively disturb 9,444 acres in the Grassy Trail Creek watershed. Applicant-proposed development and interrelated projects would cumulatively disturb 12,293 acres in the watershed (Table 3-2). Without adequate controls, these disturbances could alter the hydrologic regime and threaten the use of this watershed as a water source for downstream communities.

Grassy Trail Creek supports trout fisheries that could be harmed by tar sand development. The UDWR plans to manage Grassy Trail Creek Reservoir for its brown trout fishery and is negotiating with Kaiser Steel for public access to the reservoir. Brown trout spawning habitat occurs on both the Right and Left Forks of Grassy Trail Creek, and spawning has been documented in both stream reaches. Below the reservoir, Grassy Trail Creek has a self-sustaining rainbow trout fishery, which would be degraded by deteriorating water quality. Moreover, upgrading the road in Whitmore Canyon would increase traffic and fugitive dust, which would also degrade Grassy Trail Creek below the reservoir.

Increased sedimentation and turbidity would violate aquatic wildlife Class 3A (for a further discussion of impacts to aquatic wildlife, see Section 3.A.4, Wildlife) and would probably exceed acceptable limits for a domestic water source (Class 1C) due to sediment levels being increased for longer periods of time than at present. Total dissolved solid (TDS) concentrations could exceed Utah water quality standards for surface waters.

Included in the 12,293 acres of disturbance would be three spent sand disposal areas, which would not contribute to sediment accumulations in Grassy Trail Reservoir or lower its water quality because the areas are downstream from the reservoir. Moreover, applicant plans of operations show that the spent sand is not a hazardous waste, and construction practices of slope stabilization, compaction, and reclamation would eliminate the risk of mass failure. The areas, however, might allow leachate to reach Grassy Trail Creek and eventually the Price River. Precipitation that enters the disposal piles might leach through them during and after the life of the projects. These leachates are expected to have TDS values between those of the shale areas and those in the STSA, and these leachates could increase TDS concentrations.

Shallow ground water in the area would be affected by the loss of 23 springs due to the removal of the strata that now feed them. Most of the water would seep into the open pit and would have to be pumped out. This mine water would then be used for process water, tailings compaction, and discharge to surface streams. Whatever the water's use, regulatory authority would assure that existing downstream baseflows and water quality are maintained. Before being discharged, any mine water (and any other discharged water) would be suitably treated if needed. This standard mining practice, is required by regulatory authority. Recharge to deeper aquifers would be increased by removing impeding tar sand layers and by increased infiltration and recharge in the areas of subdued topography. Deep aquifer flow to major streams would increase.

TABLE 3-2
SUMMARY OF WATERSHED IMPACTS
(Proposed Actions)

	IMPACTS							
	Land Disturbance (acres)		Potential to Exceed State Standards	Springs				
Watershed	Collective	Cumulative		Total in Watershed	Number Affected	Deep Aquifer	Other
Grassy Trail Creek	9,444	12,293	Very high	23	23	Decrease in discharge due to dewatering	Deterioration of water quality and water supply in Grassy Trail Reservoir; TDS increase due to spent sand area and increased erosion
Range Creek	4,260	4,311	High	3	1	Little or no change in discharge	TDS increase due to spent sand area and increased erosion
Nine Mile Creek	22,075	22,075	High	85	39	Little or no change in discharge	TDS increase in tributary streams; Little or no change in TDS at mouth of Nine Mile Creek
Green River Tributaries	166	166	Very low	35	0	Little or no change in discharge due to neighboring mining	—

Note: TDS = total dissolved solids.

During mining, runoff is expected to increase due to removal of the vegetation, compaction of the soil surface, and mine dewatering. After mining and successful reclamation, however, flows are expected to fall below present levels because subdued topography would reduce runoff.

Overall, the impacts of tar sand recovery could significantly affect water uses in the Grassy Trail Creek watershed.

RANGE CREEK WATERSHED

Range Creek watershed, like Grassy Trail Creek watershed, has steep slopes, a deeply incised stream system, and high precipitation. As shown in Table 3-1, Range Creek drains 11,769 acres of the main block and is a tributary to the Green River. It contains no public water reserve and 2,201 acres of water supply reserve. (For a description of these special watershed management areas, see Appendix A-5, Water Resources.) The watershed also has three springs. BLM has designated 1,442 acres of the Range Creek watershed as having outstanding resources, including a trout fishery. A proposed disposal area would occupy most of the headwaters of Range Creek but leave the upper 1 mile in a natural condition. Another disposal area would lie downstream on Range Creek and outside of the STSA. The spent sand disposal piles would occupy 750 acres at the headwater site and 850 acres outside the STSA.

Utah State water quality laws classify stream segments for certain uses on the basis of current use and water quality. The stream segments in this watershed have Use Designation Classes 1C, 3A, and 4 (for a description of these classes, see Appendix A-5, Water Resources).

The potential exists for the applicants' proposed developments to collectively disturb 4,260 acres in the Range Creek watershed. Applicant-proposed development and interrelated projects would cumu-

latively disturb 4,311 acres in the watershed (Table 3-2). These disturbances would have similar impacts. They would leave the headwaters (upper 1 mile) of Range Creek in their natural state, but they would alter the downstream regime.

Increases in soil erosion in the watershed due to mining would be similar to those for the Grassy Trail Creek watershed; the rate of erosion could double on disturbed areas. This increase in erosion could increase TDS levels, suspended sediment, and water temperature. The probability of exceeding State water quality standards for this stream segment, however, is not as high as it is in Grassy Trail Creek watershed because there would be less disturbance and the disturbance would be concentrated in three distinct areas of the watershed (Map 3-2, map pocket of draft EIS).

Mono (1982) proposed to dispose of spent sand behind an earth dam across two tributary drainages outside of the STSA. After passing through a sediment pond before draining to the creek, runoff would have slightly increased TDS levels.

Ground water in Range Creek watershed would be altered only slightly. One spring could be lost or affected, but little water is expected to be diverted.

Overall, tar sand resource recovery could significantly disturb existing water uses in Range Creek watershed.

NINE MILE CREEK WATERSHED

The part of Nine Mile Creek watershed within the STSA has only a few steep slopes. The topography is more rolling and the precipitation is lower than in the Grassy Trail Creek or Range Creek watersheds. As shown in Table 3-1, Nine Mile Creek tributaries drain 47,076 acres of the main block to the Green River. The stream segments in this watershed have Use Designation Classes 3A and 4, and the STSA has 2,920 acres of public water reserve and 116 acres of water supply reserve. (For a description of these special watershed management areas, see Appendix A-5, Water Resources.) The watershed also has 85 springs. A portion of a proposed spent sand disposal area would occupy 750 acres of the uppermost reaches of this watershed. The stream segment in this part of the watershed has Use Designation Classes 3A and 4.

The potential exists to collectively and cumulatively disturb 22,075 acres in Nine Mile Creek watershed (Table 3-2). Because Nine Mile Creek is so large, tar sand recovery would probably not noticeably change water resources at the mouth but would disturb large surfaces, 70 percent from in-situ recovery and 30 percent from surface mining. The combination of disturbance from these recovery processes is expected to change water resources in a different manner than would surface mining alone. For example, surface roughness, tracks, and depressions caused by machinery, and rock debris and ground-up vegetation from in-situ recovery would form many depressions that could catch water, increase infiltration, and retain sediment.

Because of the proposed recovery methods, soil erosion is expected to increase less in this watershed than in watersheds where mostly surface mining would occur. Consequently, TDS are expected to increase less than in Grassy Trail watershed and sediment and resulting turbidity would be less.

The Water Quality Standards for the State of Utah for aquatic wildlife Class 3A are rarely expected to be exceeded in tributaries to Nine Mile Creek, but these increases would occur during exceptional thunderstorms and unusually high spring runoff. Even though the standards are now exceeded during these events, the period of high sediment concentrations is expected to be longer and would thus violate the standards.

Ground water in the area would mainly be affected by the loss of 24 of the 85 springs in the watershed from surface mining. These springs are in the western most portion of the watershed. Fifteen springs in the eastern part of the watershed could experience some decrease in flow. The deeper aquifers would not be affected, but large amounts of water in the form of steam would be injected. Most of this water would be recovered by pumping, but some would remain in the tar sand formations and follow existing ground water flow.

GREEN RIVER TRIBUTARIES

The watersheds of tributaries that drain directly to the Green River have landform and precipitation characteristics similar to those of the Nine Mile Creek watershed. These streams drain 23,539 acres of the main block. This area has no public water

reserve and 38 acres of water supply reserve. Some 1,960 acres of Bear Creek and Rock Creek watersheds and the headwaters of 1,266 acres of Jack Creek watershed are within this area. BLM has designated parts of these watersheds as important quality watersheds that have outstanding values. (For a description of these special watershed management areas, see Appendix A-5, Water Resources.) The watersheds have 35 springs. No spent sand disposal sites are proposed for these watersheds. The streams that drain directly into the Green River have Use Designation Classes 1C, 2B, 3B and 4. (For a description of these classes, see Appendix A-5.)

The potential exists to collectively and cumulatively disturb only 166 acres in the watersheds tributary to the Green River. Such disturbance would have almost no noticeable effect on TDS, sediment concentrations, or flow. Because of the small surface disturbance and absence of spent sand disposal areas, Utah water quality standards would not be exceeded for any given use.

Ground water in the area would be unaffected by tar sand development in the watershed, but neighboring mining in Range Creek and Nine Mile Creek watersheds could decrease yields to some wells in the watersheds tributary to the Green River by intercepting ground water flow before it can migrate into the watershed.

SUMMARY OF WATERSHED IMPACTS

Without adequate observance of existing regulations, implementing the proposed actions has the potential to significantly alter water resources within the main block. Because water sources that would be affected are in the headwaters of the streams, the impacts would probably not be noticeable at the mouths of these streams. The salinity level of the Green River would not significantly increase because of discharges from streams in the STSA. Table 3-2 summarizes local impacts by watershed.

SPECIAL WATERSHED MANAGEMENT AREAS

The 2,400 acres of public lands set aside as a water supply reserve for Sunnyside, Utah, are "reserved from all forms of location, entry, or appropriation whether under the mineral or nonmineral land laws" for the purpose of storing, conserving, and protecting from pollution this water supply, and preserving, improving, and increasing the timber growth. The Secretary of the Interior, however, may allow deposits of coal or other minerals to be leased if "he shall find that same may be mined and removed without injury to the municipal water supply of Sunnyside, Utah" (Public Law 294).

On the basis of the impacts previously discussed for Range Creek watershed (which contains almost all of the water supply reserve), the storage and conservation of water in the watershed could greatly diminish during and after any mining. Similarly, water quality could degrade as a result of increased suspended sediments and higher TDS levels.

Because of the potential deterioration of water quality, a mine as proposed for the water supply reserve in Range Creek watershed would appear to conflict with the intent of the law. A provision in the law, however, allows the leasing of the water supply reserve if the municipal water supply of Sunnyside is not injured. Because the water supply reserve in Range Creek is not used for the municipal needs of Sunnyside, leasing would apparently not conflict with the intent of the law. Sunnyside, however, might call upon the water supply reserve for a municipal need in the future. The lessee then might be called upon to supply water for these municipal needs. Such a request would be well within the rights of the town of Sunnyside and consistent with the intent of the law. As stated in CFR 779.17 and 816.54, applicants have the responsibility to "identify the alternative sources of water supply that could be developed to replace the existing sources." (For a further discussion of this issue, see the Unresolved Issues section of the Summary.)

The 3,680 acres of public lands withdrawn for public water reserves within the STSA were set aside by President Woodrow Wilson by an Order of Withdrawal for Public Water Reserve Number 16, dated March 19, 1919. This withdrawal was made under authority of the General Withdrawal Act of June 25, 1910, commonly referred to as the Pickett Act (36 Stat. 847). The Pickett Act states that "the President may, at any time in his discretion, temporarily withdraw from settlement, location, sale, or entry any of the public lands in the United States, including Alaska, and reserve the same for water-power sites, irrigation, classification of lands, or other public purposes to be specified in the orders of withdrawals, and such withdrawals or reservations shall remain in force until revoked by him or an Act of Congress."

Lands withdrawn under the Pickett Act, unless otherwise specifically provided in the withdrawal order, are open to leasing under the Mineral Leasing Act of 1920 at the discretion of the Secretary of the Interior, if the issuance of a lease will not be inconsistent with or materially interfere with the purposes for which the land is withdrawn (Rocky Mountain Mineral Law Foundation 1960).

Withdrawal Order 16 was made to reserve in public ownership the springs and watering places described in the withdrawal. The withdrawal did not preclude mineral leasing, and thus combined hydrocarbon leases may be issued with stipulations to protect the water source.

The other (Bear, Rock, and Range creeks) special watershed management areas represent a management conflict that could be mitigated or avoided by careful management and stipulations. The extent of potential conflicts with special watershed management areas are shown in Table 3-3.

WATER SUPPLY IMPACTS

Water in the area is used mostly for irrigation and is fully appropriated (Lindskov and others 1983). Water for the proposed exploration and for pilot and commercial operations will have to be purchased or leased, and changes in use and diversions will have to be adjudicated. Irrigation return flows are major contributors to the high salinity in the lower Price River. Because the bulk of water is used for irrigation, most or all required water would replace existing irrigation use and therefore eliminate an equivalent amount of mineralized return flow to the Price River system. Such replacement would also distribute water use throughout the year and increase low flows during low flow periods when the Price River sometimes stops flowing. Table 3-4 summarizes impacts on water flow and quality.

TABLE 3-3
POTENTIAL CONFLICTS WITH SPECIAL WATERSHED MANAGEMENT AREAS

Management Area	Total Acreage Affected[a]
Public Water Reserve	2,280
Water Supply Reserve	1,760
Bear and Rock Creeks Watersheds	0[b]
Range Creek Watershed	0

[a]Conversion area acreage.
[b]Although there is no direct surface disturbance in these watersheds, some water quality deterioration could result from upstream activities.

TABLE 3-4
CHANGES IN WATER FLOW AND QUALITY
(Proposed Actions)

	Range Creek + Grassy Creek Reservoir		Price River		Green River	
Parameter	Collective	Cumulative	Collective	Cumulative	Collective	Cumulative
Annual Water Use[a] (ac-ft)	5,000	5,000	16,500	21,000	14,345	14,345
Percent Reduction in Average Annual Flow	100	100	22	28	<1	<1
TDS Change	large increase	large increase	little or no change	little or no change	>1 mg/l	>1 mg/l

Note: ac-ft = acre-feet; < = less than; TSD = total dissolved solids; ± = plus or minus; mg/l = milligrams per liter; ac-ft/yr = acre-feet per year.
[a]Total water use as measured at Green River, Utah, would be 40,345 ac-ft/yr.
[b]±.03 – 0.1 Percent

3.A.2 Socioeconomics

The analysis presented here is based on the Socioeconomic Technical Report: Sunnyside Special Tar Sand Area Development Analysis (Argonne National Laboratory 1984). The analysis in the technical report does not estimate impacts in the peak construction year of 1989. The estimates of population, employment, personal income, and housing in this EIS, however, are derived in the same manner as those in the technical report.

The area of influence for socioeconomics consists of Carbon and Emery counties in Utah (see Appendix A-6).

The technical report provides detailed data on historical and current socioeconomic conditions in the area of influence, assumptions for the baseline projections and the interrelated projects, and analytical methodology. Descriptions of the area of influence are given in Appendix A-6, and work force assumptions for the interrelated projects are given in the Socioeconomic Technical Report (Argonne National Laboratory 1984). Socioeconomic mitigation is discussed in the Unresolved Issues section of the Summary and in Appendix A-4, Uncommitted Mitigation Measures.

Amoco provided new employment estimates (Grabosky 1984) too late to permit revising the socioeconomic analysis in the final EIS. These estimates increase by 10 to 20 percent all socioeconomic impacts of the proposed action for the years 2000 and 2005. Analyses of partial conversion and unitized development, however, are not affected because they do not depend on employment data from individual applicants. The underestimate does not change the significance ratings of any of the already large impacts projected to result from the proposed actions. When a plan of operations or right-of-way application is submitted by Amoco (see Section 1.A.4, Authorizing Actions), the impacts will be reanalyzed using the then current employment data.

IMPACT SIGNIFICANCE CRITERIA

Population

The counties and communities selected for inclusion in this EIS are those where significant population growth is projected as the result of the applicants' proposed tar sand developments. Significant growth is defined to be a 5 percent population increase over the baseline as required under Utah Code Annotated Section 63-51-10 (Supp. 1981) (S.B. 170). The counties and communities of interest were chosen on the the basis of Utah Process Economic and Demographic (UPED) Model population estimates.

Employment and Income

Increases in per capita personal income (PCPI) for the area of influence of 5 percent or more over the baseline are considered significant.

Public Services and Facilities, Human Services and Facilities, and Public Finance

As a general guideline, the impact on public and human services is considered significant if the increased needs in the peak construction year are 10 percent greater than needs in that year for the baseline. Additionally, any impact is considered significant that exceeds by 5 percent or more the fiscal capacity of the affected taxing jurisdiction to provide services and facilities from normal revenue sources.

POPULATION AND EMPLOYMENT

The area of influence consists of two counties in east-central Utah—Carbon and Emery. Much of east-central Utah is sparsely populated. The two-county area had only 5.7 people per square mile in 1980. Emery County had 2.6 per square mile, and Carbon County had 15.0 per square mile. Utah had 17.8 people per square mile in 1980, and the figure for the United States was 64.0. Price (Carbon County) is the only community in the area with a population exceeding 4,000 in 1980. No town had a population as large as 10,000.

Traditionally, the economy of most of east-central Utah has depended on agriculture or energy development. As of 1980, mining was the main employer in Carbon and Emery counties. The region is well acquainted with the cyclical nature of industrial, especially energy-related, growth. The coal industry in Carbon and Emery counties has experienced frequent boom and bust periods. Of the 6,040 workers

in Carbon County in 1981, 52 percent were engaged in mining, contract construction, or manufacturing. Of the 3,695 workers in Emery County in 1981, 2,098 were engaged in mining, between 500 and 1,000 were engaged in contract construction, and between 20 and 100 were engaged in manufacturing. Mining employment in Carbon County would significantly increase due to the development of the interrelated projects. Most of the interrelated projects planned for Carbon County involve either expanding existing coal mines or opening new mines. Emery County is scheduled to realize relatively minor employment growth due to the interrelated projects. Mining is the only sector in which substantial growth would occur. Under the proposed actions, the applicants' collective construction work forces would peak in 1989 at 3,810, and the permanent operation work forces would peak in 2003 at 4,910 (Table 1-12, Section 1.H). Applicant proposed projects would cause a population increase of 23,610 by 2005 (Table 3-5). The cumulative (including interrelated projects) population increase would amount to 44,870 by 2005. These increases would exceed the 2005 baseline for the area of influence by 46 percent for the proposed actions and 87 percent for the proposed actions and interrelated projects.

Carbon County would undergo the greater population growth. In 2005, Carbon County's population would increase by 58 percent over baseline as a result of applicant projects. This increase would amount to 112 percent when including interrelated projects.

On a community level, Price would experience the greatest population growth. The communities of Sunnyside, East Carbon, and Wellington, however, would have the greatest population growth relative to baseline, with increases in 2005 of 540 percent (directly related to proposed actions) and 714 percent (cumulative) in Sunnyside, 486 percent (applicants) and 645 percent (cumulative) in East Carbon, and 89 percent (applicants) and 192 percent (cumulative) in Wellington. On the basis of the significance criterion of a 5 percent or more increase over baseline, both counties and all communities in the area of influence would experience significant population impacts. The populations of some unincorporated areas within Carbon County are also expected to substantially grow. Applicant projects would increase the population of the unincorporated portion of the Price Census County Division (CCD) by 31 percent over baseline in 2005; with interrelated projects, the increase over baseline would amount to 68 percent.

Table 3-6 shows employment growth for the affected counties. Employment statistics do not exist for community level analysis. For the area of influence, total employment in 2005 is expected to increase by 42 percent over the baseline as a result of applicant proposals and by 81 percent as a result of applicant and interrelated projects.

Carbon County would have the greater increase in employment. In 2005, Carbon County employment would increase more than 50 percent over the baseline due to applicant projects and would be more than double the baseline with the interrelated projects included. Emery County would experience only a 5 percent employment growth from applicant projects, but its growth would rise to 31 percent as a result of applicant and interrelated projects. Employment in both counties would thus significantly increase.

PERSONAL INCOME

Per capita personal income (PCPI) in Carbon County increased by 42 percent from 1970 to 1980. In 1979, PCPI peaked at $10,489—the highest PCPI in either county during the 10-year period. PCPI in Emery County increased by 40 percent between 1970 to 1980 but dropped by 16 percent from 1979 to 1980. Only once during the 10-year period did PCPI reach $8,000: the 1979 PCPI was $8,078.

During peak construction, however, the applicants' proposed tar sand developments would significantly increase the area's PCPI to $11,624, a 13 percent increase over the baseline projection of $10,243 (both in 1980 dollars). Because mining gives the area of influence a relatively high PCPI, the applicants' proposed tar sand developments would not significantly increase the area's PCPI over the projected baseline level during operation. Nevertheless, when the interrelated projects are added, the increase would be significant. By 2005 applicant and interrelated projects would increase PCPI by 7 percent to an estimated $13,529, as compared to the baseline projection of $12,602.

TABLE 3-5
POPULATION IMPACTS
(Proposed Actions)

	1980	1989	2005	1980	1989	2005
		Total Area of Influence			Carbon County	
Baseline Population	33,630	48,190	51,830	22,179	33,520	37,280
Applicants' Collective Impacts		15,030	23,610		13,100	21,530
Percent Increase Over Baseline		31	46		39	58
Interrelated Projects		14,280	21,260		13,260	20,110
Cumulative Impacts		29,310	44,870		26,360	41,640
Percent Increase Over Baseline		61	87		79	112
Total Population	33,630	77,500	96,700	22,179	59,880	78,920
		East Carbon			Sunnyside	
Baseline Population	1,942	1,280	995	611	400	315
Applicants' Collective Impacts		2,710	4,840		950	1,700
Percent Increase Over Baseline		212	486		238	540
Interrelated Projects		1,450	1,580		510	550
Cumulative Impacts		4,160	6,420		1,460	2,250
Percent Increase Over Baseline		325	645		365	714
Total Population	1,942	5,440	7,415	611	1,860	2,565
		Helper			Unincorporated Areas of Helper CCD	
Baseline Population	2,724	3,820	4,100	1,729	2,450	2,660
Applicants' Collective Impacts		660	690		440	460
Percent Increase Over Baseline		17	17		18	17
Interrelated Projects		440	1,160		290	780
Cumulative Impacts		1,100	1,850		730	1,240
Percent Increase Over Baseline		29	45		30	47
Total Population	2,724	4,920	5,950	1,729	3,180	3,900
		Price			Wellington	
Baseline Population	9,086	15,700	18,500	1,406	2,510	2,800
Applicants' Collective Impacts		5,420	9,000		1,500	2,490
Percent Increase Over Baseline		35	49		60	89
Interrelated Projects		6,870	10,420		1,900	2,890

TABLE 3-5 (Continued)
POPULATION IMPACTS
(Proposed Actions)

	1980	1989	2005	1980	1989	2005
Cumulative Impacts		12,290	19,420		3,400	5,380
Percent Increase Over Baseline		78	105		135	192
Total Population	9,086	27,990	37,920	1,406	5,910	8,180
	Unincorporated Areas of Price CCD			Emery County[a]		
Baseline Population	4,327	6,960	7,500	11,451	14,670	14,550
Applicants' Collective Impacts		1,420	2,350		1,930	2,080
Percent Increase Over Baseline		20	31		13	14
Interrelated Projects		1,800	2,730		1,020	1,150
Cumulative Impacts		3,220	5,080		2,950	3,230
Percent Increase Over Baseline		46	68		20	32
Total Population	4,327	10,180	12,580	11,451	17,620	17,780
	Castle Dale			Cleveland		
Baseline Population	1,910	2,850	2,850	522	600	600
Applicants' Collective Impacts		460	570		80	100
Percent Increase Over Baseline		16	20		13	17
Interrelated Projects		270	320		40	60
Cumulative Impacts		730	890		120	160
Percent Increase Over Baseline		26	31		20	27
Total Population	1,910	3,580	3,740	522	720	760
	Elmo			Huntington		
Baseline Population	300	370	360	2,316	2,970	2,850
Applicants' Collective Impacts		50	60		330	410
Percent Increase Over Baseline		14	17		11	14
Interrelated Projects		30	40		190	230
Cumulative Impacts		80	100		520	640
Percent Increase Over Baseline		22	28		18	22

TABLE 3-5 (Concluded)
POPULATION IMPACTS
(Proposed Actions)

	1980	1989	2005	1980	1989	2005
Total Population	300	450	460	2,316	3,490	3,490
		Orangeville		Unincorporated Areas of Castle Dale-Huntington CCD		
Baseline Population	1,309	1,970	1,970	1,489	1,570	1,570
Applicants' Collective Impacts		330	410		70	80
Percent Increase Over Baseline		17	21		4	5
Interrelated Projects		190	230		40	50
Cumulative Impacts		520	640		110	130
Percent Increase Over Baseline		26	32		7	8
Total Population	1,309	2,490	2,610	1,489	1,680	1,700
		Green River		Unincorporated areas of Green River CCD		
Baseline Population	956	960	1,000	166	160	170
Applicants' Collective Impacts		520	360		90	60
Percent Increase Over Baseline		54	36		56	35
Interrelated Projects		190	90		30	10
Cumulative Impacts		710	450		120	70
Percent Increase Over Baseline		74	45		75	41
Total Population	956	1,670	1,450	166	280	240

Note: CCD = Census County Division.
[a]Includes insignificant impacts to the Emery-Ferron CCD.

TABLE 3-6
EMPLOYMENT IMPACTS
(Proposed Actions)

	1980	1989	1980	2005	1989	2005
	Total Area of Influence			Carbon County		
Baseline Employment	14,837	20,360	22,900	9,385	13,690	16,020
Applicants' Collective Impacts		7,880	9,710		7,590	9,350
Percent Increase Over Baseline		39	42		55	58
Interrelated Projects		7,060	8,940		6,340	8,100
Cumulative Impacts		14,940	18,650		13,930	17,450
Percent Increase Over Baseline		73	81		102	109
Total Employment	14,837	35,300	41,550	9,385	27,620	33,470
	Emery County					
Baseline Employment	5,452	6,670	6,880			
Applicants' Collective Impacts		290	360			
Percent Increase Over Baseline		4	5			
Interrelated Projects		720	840			
Cumulative Impacts		1,010	1,200			
Percent Increase Over Baseline		15	17			
Total Employment	5,452	7,680	8,080			

Most personal income increases would occur in Carbon County. In 1989, 87 percent of total personal income increases would occur in Carbon County as a result of the applicants' proposed projects, and this percentage would rise to 91 by 2005. The cumulative impact increase would be even greater, with 90–93 percent of the total personal income increase occurring in Carbon County.

The substantial increase in personal income for the area of influence of $443 million (1980 dollars) by 1989 and $655 million by 2005 could significantly increase the cost of consumer goods and services and of housing. Significant local price inflation could result from local increased purchasing power. This inflation would harm people with fixed incomes, like the elderly and those lacking skills to be employable in higher income occupations.

HOUSING

Adequate housing provides a basic foundation for community stability and job satisfaction. The collective impacts of the applicants' proposed projects would seriously test the ability of the affected communities to provide adequate and affordable housing. Table 3-7 shows the increased household demand that would result from applicant proposed projects, from interrelated projects, and from both. Household, as used here and in the population census, refers to the person or group of persons, related or not, who occupy a housing unit. The projected increase in number of households is the measure of future demand for new housing units. The 1980 column shows the total housing supply in that year. For the socioeconomic area of influence, the demand for housing units would increase by 42 percent over baseline by 2005; applicant and interrelated projects would increase housing demand by 82 percent by 2005.

Housing demand would increase the most in Carbon County, and Price would experience the greatest absolute housing demand increase of the communities in the area of influence. Sunnyside, East Carbon, and Wellington, however, would experience the greatest housing demand increases compared to baseline. Under the significance criterion of 5 per-

TABLE 3-7
HOUSEHOLD PROJECTIONS
(Proposed Actions)

	1980[a]	1989	2005	1980[a]	1989	2005
	Total Area of Influence			Carbon County		
Baseline Households	11,454	14,590	15,670	7,794	10,570	11,700
Applicants' Collective Impacts		5,510	6,650		4,800	6,070
Percent Increase Over Baseline		38	42		45	52
Interrelated Projects		4,790	6,180		4,440	5,850
Cumulative Impacts		10,300	12,830		9,240	11,920
Percent Increase Over Baseline		71	82		87	102
Total Households	11,454	24,890	28,500	7,794	19,810	23,620
	East Carbon			Sunnyside		
Baseline Households	714	400	310	206	130	100
Applicants' Collective Impacts		990	1,360		350	480
Percent Increase Over Baseline		248	439		269	480
Interrelated Projects		500	460		170	160
Cumulative Impacts		1,490	1,820		520	640
Percent Increase Over Baseline		372	587		400	640
Total Households	714	1,890	2,130	206	650	740
	Helper			Unincorporated Areas of Helper CCD		
Baseline Households	1,074	1,200	1,280	659	790	840
Applicants' Collective Impacts		240	200		160	130
Percent Increase Over Baseline		20	16		20	15
Interrelated Projects		150	340		100	230
Cumulative Impacts		390	540		260	360
Percent Increase Over Baseline		32	42		33	43
Total Households	1,074	1,590	1,820	659	1,050	1,200
	Price			Wellington		
Baseline Households	3,195	4,950	5,790	433	790	900
Applicants' Collective Impacts		1,990	2,540		550	700
Percent Increase Over Baseline		40	44		70	78
Interrelated Projects		2,290	3,030		630	840
Cumulative Impacts		4,280	5,570		1,180	1,540
Percent Increase Over Baseline		86	96		149	171
Total Households	3,195	9,230	11,360	433	1,970	2,440
	Unincorporated Areas of Price CCD			Emery County[b]		
Baseline Households	1,365	2,190	2,350	3,660	4,202	3,970
Applicants' Collective Impacts		520	660		710	580
Percent Increase Over Baseline		24	28		18	15

TABLE 3-7 (Concluded)
HOUSEHOLD PROJECTIONS
(Proposed Actions)

	1980[c]	1989	2005	1980[a]	1989	2005
Interrelated Projects		600	790		350	330
Cumulative Impacts		1,120	1,450		1,060	910
Percent Increase Over Baseline		51	62		26	23
Total Households	1,365	3,310	3,800	3,660	5,080	4,880
		Castle Dale			Cleveland	
Baseline Households	622	780	780	156	170	160
Applicants' Collective Impacts		170	160		30	30
Percent Increase Over Baseline		22	21		18	19
Interrelated Projects		90	90		20	20
Cumulative Impacts		260	250		50	50
Percent Increase Over Baseline		33	32		29	31
Total Households	622	1,040	1,030	156	220	210
		Elmo			Huntington	
Baseline Households	90	100	100	757	810	780
Applicants' Collective Impacts		20	20		120	110
Percent Increase Over Baseline		20	20		15	14
Interrelated Projects		10	10		60	70
Cumulative Impacts		30	30		180	180
Percent Increase Over Baseline		30	30		22	23
Total Households	90	130	130	757	990	960
		Orangeville			Unincorporated Areas of Castle Dale-Huntington CCD	
Baseline Households	397	540	530	414	440	430
Applicants' Collective Impacts		120	110		20	20
Percent Increase Over Baseline		22	21		5	5
Interrelated Projects		60	70		10	10
Cumulative Impacts		180	180		30	30
Percent Increase Over Baseline		33	34		7	7
Total Households	397	720	710	414	470	460
		Green River			Unincorporated areas of Green River CCD	
Baseline Households	338	260	270	37	40	50
Applicants' Collective Impacts		190	100		30	20
Percent Increase Over Baseline		73	33		75	40
Interrelated Projects		70	20		10	5
Cumulative Impacts		260	110		40	25
Percent Increase Over Baseline		100	41		100	50
Total Households	388	520	380	37	80	75

Note: CCD = Census County Division.
[a]Total available stock of year-round housing units.
[b]Includes insignificant impacts to the Emery-Ferron CCD.

cent, housing increase demand over baseline, all communities would be significantly affected. Although increased housing demand would benefit the housing construction and finance industries, the small housing supply could contribute to land speculation and increased housing costs in all of the significantly affected communities with the possible exception of Cleveland, Elmo, and Green River.

LOCAL GOVERNMENT SERVICES AND FACILITIES

These assessments of local government services and facilities are based on the Socioeconomic Technical Report (Argonne National Laboratory 1984). The method used to derive the estimates for the peak construction year is described in Appendix A-6, Socioeconomics.

Education

Applicant proposed projects would significantly increase the need for teachers and classrooms over the projected baseline in the area of influence. These developments would most severely affect Carbon County, creating a demand for 260 more teachers and classrooms by 2005, a 138 percent increase over the number required by baseline growth. With interrelated projects, the increase by 2005 would be 500 teachers and classrooms or 265 percent. Emery County would need 25 more teachers and classrooms (41 percent increase) as a result of applicant proposed projects alone and would have a cumulative demand increase of 40 teachers and classrooms (66 percent) by 2005 with addition of the interrelated projects. Such large increases in classrooms would require the expansion of the school systems to about equal this demand, since the baseline demand would eliminate any existing capacity in Carbon County and 77 percent of existing capacity in Emery County.

Medical Services

All medical services and facilities would be severely affected under the proposed actions because no more capacity would exist to support the increased demand caused by the applicant and interrelated projects. Even under the baseline demand, more physicians, dentists, and hospital beds would be needed by 1985. Needs would increase most significantly in Carbon County, but Emery County also could be highly affected if its present lack of services continues at that time. Under the proposed actions, by 2005 the area of influence would need 14 more physicians and 12 more dentists (117 percent and 120 percent respectively over baseline demand). The area of influence would also need 93 percent more hospital beds by 2005. Including the interrelated projects would raise these needs to 27 physicians (225 percent increase), 22 dentists (220 percent increase), and 150 hospital beds (176 percent increase) by 2005.

Social and Mental Health Services

Understaffing and rising case loads now decrease the effectiveness of social and mental health services in the area of influence. One more psychologist and 10 more social workers would be needed as a result of baseline growth in the next years (Walker 1983). Increased population caused by applicant and interrelated projects would create a further need for 3 psychologists and 30 social workers by 2005.

Law Enforcement

Under the proposed actions, demand for law officers and patrol cars would significantly increase over baseline in the area of influence. By 2005, such demand in Carbon County would increase by 139 percent as a result of the applicants' proposed projects and by 268 percent with addition of the interrelated projects. Demands in Emery County would increase by 57 percent and 86 percent, respectively, representing, however, four to six more officers and patrol cars. Jail facilities would also have to be expanded, particularly in Carbon County where the existing facility is overcrowded.

Fire Protection

More fire equipment could be needed in the area of influence, but existing data does not allow numerical estimates. Moreover, at least some communities might no longer be able to rely on volunteer fire departments.

Sewage Disposal

Sewage system capacity figures are not available for several of the communities. Existing data shows that the systems in Castle Dale, Orangeville, Cleveland, and Elmo would be adequate for the cumulative population growth projected under the proposed actions. The systems in both East Carbon (including Sunnyside) and Huntington, however, would be overloaded by the construction peak in 1989. The combined system of Price, Helper, and Wellington is operating over its design capacity, and its planned expansion to meet the needs of a population of 31,500 would still fall short of the needs in the peak construction year of 1989, when a combined population of 38,800 is projected for the three towns.

Solid Waste Disposal

Neither the mine nor the plant sites would generate large volumes of solid waste other than overburden and spent sand. The small volumes that would be generated could easily be disposed of in the mine overburden or spent sand disposal piles and meet all state and local laws.

According to the Socioeconomic Technical Report page 52, the landfill serving East Carbon and Sunnyside has room for substantial expansion. Capacities of other county and community landfills in the area are not known. Community solid waste disposal requirements would be proportional to population growth. Estimates of other infrastructure impacts are based on Utah community facility guidelines, which do not include a solid waste standard. Community solid waste impacts are thus not estimated.

Water

The proposed actions would significantly increase demands for water over baseline in both Carbon and Emery counties. Water demand in Carbon County, as measured by number of water system connections, would increase by 143 percent over baseline by 2005 as a result of applicant proposed projects and would increase by 276 percent with the addition of the interrelated projects. In Emery County, the comparable increases would be 67 and 104 percent.

Existing information reveals that some community water systems have little or no excess capacity in number of connections. In Carbon County, the Price water treatment plant's design capacity is not meeting current demand. The system serving East Carbon and Sunnyside gets its water from the Grassy Trail Creek watershed, which would be affected by tar sand mining. Scofield Reservoir, the sole source of water for Wellington and the unincorporated area surrounding Price and Wellington, is being used at 50 to 60 percent of its capacity. In Emery County, the system that serves Cleveland, Elmo, Huntington, Orangeville and Castle Dale would have enough connections to meet the needs of the cumulative population growth under the proposed actions and interrelated projects.

LOCAL GOVERNMENT FINANCE

The local governments in the area of influence vary widely in their ability to absorb financial impacts. The following analysis focuses on general obligation indebtedness, which would determine the capacity of local governments to provide the infrastructure improvements needed for future growth.

Carbon County had no outstanding general obligation bonds in 1981; East Carbon, Helper, and Price had indebtedness in 1982 ranging from $200,000 to $800,000. Wellington had $6,000 in outstanding general obligation bonds in 1981, and until the 1982 water bond issues, Sunnyside had no indebtedness.

The Price Water Improvement District is the other major taxing jurisdiction in Carbon County. The district provides utility services for many county residents and may assume responsibility for all water and sewer service in the county. The district has incurred three forms on long-term debt: general obligation bonds, revenue bonds, and notes payable. General obligation bonds amount to nearly $3.2 million outstanding or 40 percent of the bond capacity of the district. Nearly $900,000 in revenue bonds are outstanding, as are $450,000 of notes payable. Total long-term debt exceeds $4.5 million.

In 1981, Emery County had $2,363,587 in outstanding general obligation bonds. On the basis of its high assessed valuation, Emery County has the capacity to enter into at least $21 million more of indebtedness. Between 1980 and 1982, the cities in the county had outstanding debts ranging from $116,000 in Ferron to $1.1 million in Huntington. Cleveland had no outstanding debts.

The Emery County School District ranks as the fifth wealthiest in Utah in assessed valuation per student ($66,427 in 1981 to 1982), and the valuation to support school expenditures has steadily grown.

In addition to the county, community, and school districts, the Castle Valley Special Service District (CVSSD) is a major taxing jurisdiction in the county. The CVSSD has incorporated the water, sewer, drainage, and road needs of Castle Valley communities (Cleveland, Elmo, Huntington, Castle Dale, Orangeville, Ferron, and Emery) into a taxing district that includes both the communities and the power plants. The district thus has substantial financial power. Since 1977, it has issued bonds for $20 million to support a variety of improvements.

Because demands on community infrastructure from baseline growth would equal or exceed present capacities in many cases, the greater demands that would be imposed by applicant and interrelated projects would require significant increases in the capacity of classrooms, medical facilities, jails, water and sewer systems, and probably other facilities not included in this analysis, particularly in Carbon County. Most of the additional capacity would be needed to meet the demands of the construction period, but the largest part of the increased revenues from the developments would become available only after the buildup of mining operations. Also, these revenues would accrue largely to the counties, since the mines would be located in unincorporated areas, whereas much of the infrastructure costs would be borne by the communities.

Operating expenditures would be increased by needs for more administrative and professional employees, greater demands on public safety and social welfare services, and the operation and maintenance costs of the expanded infrastructure. More fiscal information is provided in the Socioeconomic Technical Report (Argonne National Laboratory 1984).

Severe fiscal pressure is expected to result from the proposed actions unless this pressure is mitigated by the impacting companies with some federal and state assistance. The rapid population growth would cause immediate increases in service demand. Revenues would lag initially, and coordinated mitigation planning, such as that required by Utah Code Annotated Section 63-51-10 (Supp. 1981) (Senate Bill 170) and the Carbon County Conditional Use Permit, would be needed to avoid severe short-term service inadequacies.

The long-term fiscal effects could be both beneficial and adverse. Large-scale investments in the proposed projects would greatly increase the tax base, especially for the affected counties and districts, but long-term adverse effects could result from facilities becoming under-used tax burdens any time the project-related population declines significantly.

OTHER AFFECTED INDUSTRIES

Hunting, Fishing, and Nonconsumptive Wildlife Use Expenditures

Hunting, fishing, and nonconsumptive use of wildlife (bird-watching, photography) would bring income to the local economy in the form of local expenditures by outsiders. These purchases are made for lodging, food, gasoline, and sporting goods. Expenditures and numbers of participants (1978 to 1982) for Carbon County are shown in Table 3-8.

The monetary value of the wildlife resources to Carbon County is high and is in addition to the license monies that support Utah's wildlife management programs. Hunting success rates, the number of days spent hunting and fishing, and nonconsumptive uses of wildlife in Carbon County are discussed in Section 3.A.5, Recreation Resources.

Mule deer using ranges in the STSA have not completely recovered from the severe declines during the late 1960s. In spite of the present low population level, the mule deer is an important trophy and game species in this area, of significant importance to Carbon County because of the number of hunters it attracts. Not only is the the food value of harvested deer high (about 300,600 pounds of meat during the 1978 to 1982 period), but deer hunters spent an estimated $2,915,777 in Carbon County from 1978 to 1982 (Table 3-8). Deer hunting thus gives a large boost to the local economy.

Black bear and cougar occur in large numbers in the STSA. A quarter of the state cougar harvest occurs in deer herd unit 27B, (UDWR 1983), and both of these species furnish considerable hunting and economic return. From 1978 to 1982, bear hunters spent an estimated $5,354, and cougar hunters spent an estimated $48,671.

Small game hunters spent $3,110,003 during the same period hunting nine species, and waterfowl hunters spent $250,615.

TABLE 3-8
SUMMARY OF HUNTING STATISTICS (1978 TO 1982) IN THE AFFECTED AREA[1]

Item	Total Participants	Number of Animals Harvested	5-Year Total Expenditures
Big Game[2]			
Mule Deer	10,286	3,006	$2,915,777
Black Bear[3]	14	5	5,354
Mountain Lion[3]	24	18	48,671
Upland Game[4]	27,025	131,019	3,110,003
Waterfowl[5]	1,196	9,199	165,008
Waterfowl[6]	780	3,817	85,607
Fishing[7]	7,514	N/A	2,744,755

[1]The data for this table were derived from various reports developed by the Utah Division of Wildlife Resources for the 1978-1982 period (UDWR 1978-1982).

[2]No open seasons on elk or bighorn sheep in this area.

[3]Based on very small sample sizes.

[4]Includes 9 species of upland game.

[5]Includes both duck and goose hunters.

[6]Includes **only** data from the Desert Lake Waterfowl Management Area in Emery County for duck and goose hunters.

[7]Includes only data for 1980 in Carbon County.

Methods of collecting fishing pressure and expenditure data in Utah make it impossible to determine fishing pressure solely for the affected area. Because fishing pressure and expenditures are expected to increase the most in Carbon County, however, the following data is presented for this county.

According to calculations using the 1980 census for Carbon County, the 7,514 persons who fished in the county spent an average of $361 per year per person in fishing. Total estimated l980 fishing-related expenditures for this county amounted to $2,744,755, based on Fish and Wildlife Service and Bureau of the Census (1982) data. Although the most recent such data for Carbon County is for 1980, the data does show that fishing generates large expenditures in the county.

In 1980, 22,179 persons lived in Carbon County. If data presented in Allred (1976) remains valid, 30 percent of these persons were involved in nonconsumptive uses of county wildlife. These nonconsumptive users annually spent $87.40 each in pursuit of birdwatching and general wildlife observation trips. Combined they spent at least $581,560 (1980 dollars) in the county in 1980. Estimated expenditures from 1978 to 1982 for nonconsumptive uses of wildlife was $2,908,205 by 33,624 persons. The estimated minimum value of consumptive and nonconsumptive uses of wildlife in Carbon County in 1980 dollars amounted to at least $9,075,175 for the 1978 to 1982 period.

Utah Division of Wildlife Resources data reveals that estimated increases in hunting expenditures from 1980 to 1985 would be $1,682 (1980 dollars) due to population increases resulting from the proposed actions. In 1995, the collective estimated increase would be $373,917. For nonconsumptive uses of wildlife, under the collective scenario, expenditures would increase by $1,835 in 1985 and by $399,855 in 1995. Under the cumulative scenario, 1985 hunting expenditures would increase by $108,852, and the 1995 expenditures would increase by $742,194. Expenditures for nonconsumptive uses would increase by $116,470 in 1985 and by $793,679 in 1995.

Although expenditures would increase, the overall use of wildlife and the removal or change in habitats

could so reduce wildlife populations that the number of persons involved in consumptive and nonconsumptive wildlife use would decline. This decline could in turn reduce the potential long-term economic benefits from wildlife. (See Section 3.A.4, Wildlife, for a more detailed discussion of the expected impacts to wildlife from the Sunnyside project.)

Fishing and Floatboating Expenditures

Of the 31,815 user days of floatboating through Desolation Canyon on the Green River in 1981 (Section 3.A.5, Recreation Resources), 14,000 involved commercial floatboating enterprises. At an average charge of $50 per day (Kenna 1984), commercial user days represent an annual income of $700,000 to that industry. Adding another $500,000 for expenditures by fisherman, noncommercial floatboaters, and other commercial and noncommercial sightseers gives an estimated annual value of $1.5 million for recreation on the river.

The extent to which tar sand development would affect recreation values cannot be estimated because one cannot predict the reactions of users to the sight of project facilities along the river, which now has only a few intrusions. Commercial and noncommercial floatboaters could make fewer repeat visits, but this impact cannot be quantified because too few records have been kept for rivers that have been similiarly developed.

QUALITY OF LIFE

A large development in a fairly sparsely populated area would both improve and degrade the quality of life. Adverse impacts would occur first in the form of service shortfalls, local government fiscal problems, housing shortages and inflation, and strains on social organizations and individuals. Later, when these problems are overcome, the area would benefit from a larger employment and tax base and a stronger infrastructure.

The local social changes resulting from the projected population growth could be significant and would likely cause serious adjustment difficulties in several of the communities, especially East Carbon, Sunnyside, and Wellington. On the other hand, impact of growth would be mitigated by the fact that most of the communities in the area of influence have recently experienced boom conditions and are familiar with the problems that accompany them.

Because Price, the area's largest community, has already undergone many of the following changes, these changes apply mainly to the smaller communities.

Population growth could lead to more local governmental formality and regulation. Local governments could require more outside professional help in dealing with growth-related problems. Authorities at the state, county, and municipal levels would have to coordinate to deal with growth issues, and industrial firms would need to cooperate with government. The affected communities could become more segmented and diversified and length of residence, occupation, religious preference, and similar characteristics could become even more influential in defining relations among residents.

Retail expansion could increase employment opportunities for young people and others who may have limited work experience, but this economic activity also could lead to young people leaving high school to enter the job market. Overall, more mining and construction jobs would eliminate present unemployment problems and enable residents, especially young people, to find work in the area rather than being forced to move elsewhere for employment.

Increased employment and population resulting from tar sand development would add to the volume of local business but would also bring in more competition.

The smaller communities, in particular, would change toward more urban atmospheres. Community life would become more impersonal, and residents, especially women and the elderly, would feel less secure as large numbers of new people enter the area.

Residence in a rapid-growth area would create stress, which is likely to be more evident among newcomers, particularly women. The increased level of stress and uncertainty could be reflected in higher levels of reported crime at rates exceeding population growth. Family instabilities (conflicts, child abuse, divorce,) could increase, particularly in more crowded residential environments. Housing shortfalls would intensify these problems.

Availability of other community services and facilities could also be a problem. Quality of education could suffer if physical plants, personnel, and maintenance funds cannot be obtained in a timely manner. Health care is typically a problem in such

settings as well. A shortage of facilities, doctors and nurses, and particularly emergency care treatment could cause genuine hardships. Mental health services, already pressured in the area of influence, could be critical in reducing some of the adaptive problems faced by individuals. The availability of all these services would reduce the instabilities that often accompany rapid growth.

The proposed actions would lower the quality of outdoor recreation, an important amenity to residents of the area of influence. The demand would increase for consumptive and nonconsumptive uses of wildlife. Campgrounds and other developed sites would become more crowded, dispersed recreation areas would have to be shared with more users, and the nearly unlimited existing outdoor recreation opportunities would be more difficult to find.

These effects would be most immediate and intense for newcomers, who would lack resources to deal with them. As construction nears completion and the proposed facilities become operational, however, the local social environment would become more stable and predictable.

The attitudes of residents toward the proposed developments would probably be keyed to the degree of permanence they would be offered. The area's history of mining booms and busts and the current unemployment problem have created great concern about economic stability. Residents might greet announced plans with skepticism until it becomes certain that the developments would occur and would be relatively long term.

3.A.3 Soils and Vegetation

IMPACT SIGNIFICANCE CRITERIA

The impact significance criteria for soils and vegetation are based on (1) professional experience concerning the effectiveness of erosion control, reclamation, soil reconstruction, and revegetation measures for similar kinds of projects; and (2) a body of research as referenced in the Erosion Control, Reclamation, and Revegetation Program Checklist developed by the BLM, Division of EIS Services (Appendix A-7, Reclamation and Erosion Control Programs).

Impacts to soils are considered significant if the loss of soil and reduction in soil productivity and stability due to land disturbance would prevent successful restoration and recovery to near preconstruction conditions.

Impacts to vegetation are considered significant if (1) following construction, more than 5 years would be needed to reestablish a ground cover; (2) poisonous and noxious weeds would invade and occupy more than 10 percent of a specific vegetation type where none existed before; or (3) the diversity of preconstruction vegetation types could not be restored due to topographic or microclimatic changes.

SETTING

The main block of the STSA, where the most impacts would occur, consists of moderately steep sloping to very steep mountains with narrow crests and valleys, including some gently sloping to strongly sloping plateaus, mesas, and convex ridges. The area is dissected by a dendritic drainage pattern of intermittent and perennial streams that drain to the southwest, south, southeast, and northwest. The area southwest of the main block where some of the proposed processing plants and spent sand disposal piles would be placed, consists of gently sloping to strongly sloping alluvial fans, piedmont plains, and piedmont slopes from the surrounding mountains that have formed a broad intermountain basin. Intermittent streams with narrow floodplains are common, draining to the south and southeast. Figure 3-1 shows the complex topography of the affected area.

Elevations range from 5,630 feet at Sunnyside Junction to 10,285 feet at Bruin Point. Average annual precipitation ranges from 8 to 30 inches (Map 3-2, map pocket of draft EIS).

SOILS

The proposed actions are not expected to significantly affect soils because of the applicants' proposed reclamation procedures and measures required by BLM (Appendix A-7, Reclamation and Erosion Control Programs). Some localized, very steep areas (about 5 to 8 percent of the area) resembling talus-like slopes with a low productive capacity, however, could remain in the reclaimed landscape. The size and productivity of these areas would be the same as preconstruction rock outcrop areas (canyon walls, escarpments, and exposures). The mining disturbance and complete alteration of

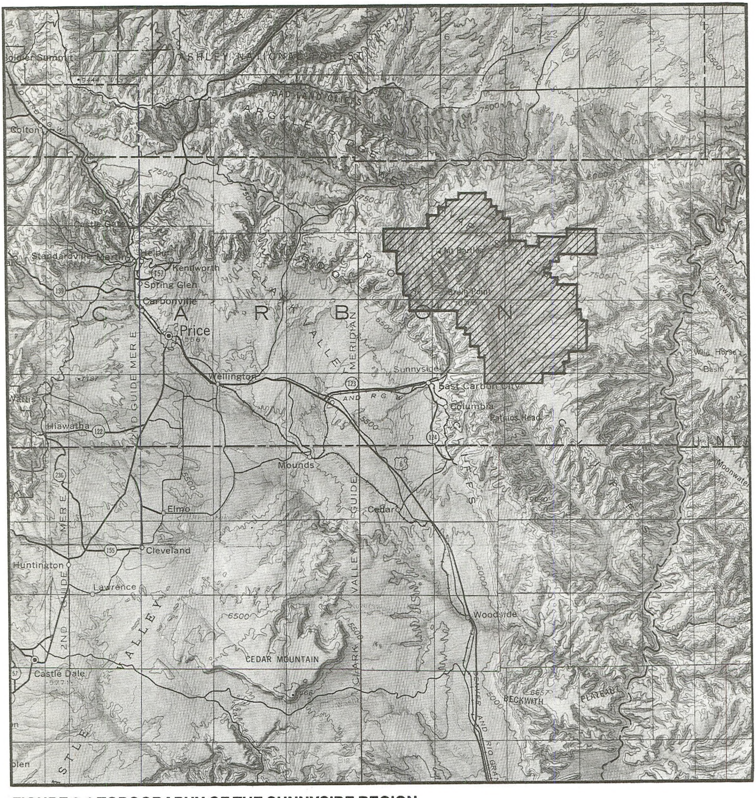


FIGURE 3-1 TOPOGRAPHY OF THE SUNNYSIDE REGION

the existing soil profiles and landscape would cause short-term losses of soil productivity and an increase in soil loss due to erosion by wind and water from initial disturbance until reclamation and initial establishment of understory plants. This section discusses the types of land disturbance that would affect soils and significantly affect other resources such as vegetation, water, and wildlife.

A third-order soil survey (SCS and BLM 1981) covers the entire Sunnyside STSA. Soil information from this survey was used to evaluate potential impacts and would be used by the applicants and authorizing agencies to determine erosion control, reclamation, and revegetation measures. The area of influence includes a variety and complex combinations of soils due to variations in parent material (geologic), climate, topography, and vegetation.

The soil map units from the third-order soil survey were combined into four generalized groups for impact analysis and for determining effective erosion control measures and the area's reclamation and revegetation potential. Soil groups were further divided by their location in different climatic zones.

The generalized groups are (1) soils of the floodplains and terraces (A); (2) soils of the sloping to strongly sloping alluvial fans and high terraces of the plains (F); (3) soils of the sloping to strongly sloping mesas, mountain ridgetops, plateaus, and strongly sloping to moderately steep mountain sideslopes (M); and (4) soils of the steep and very steep mountain sideslopes, canyon walls, and mesa escarpments (MS). Soil groups M and MS were further divided into three climatic zones:

1 - 12 to 16 inches of precipitation and 60 to 120 days growing season
2 - 16 to 20 inches of precipitation and 60 to 120 days growing season
3 - 20 to 30 inches of precipitation and less than a 60-day growing season

Appendix A-7, Reclamation and Erosion Control Programs, briefly describes these soils, and more detail on soil types and the analysis process may be inspected at the BLM's Division of EIS Services in Denver.

Table 3-9 presents the collective and cumulative acreages of disturbance by soil groups. The proposed conversion of leases and tar sand development would collectively disturb 35,945 acres (Table 3-9). Interrelated projects and the conversion-related tar sand development cumulatively would disturb 38,845 acres. The land disturbance would result from the following activities (listed in descending order of size):

1. Surface mining
2. In-situ recovery
3. Spent sand disposal
4. Ancillary facilities (pipelines, roads, power lines)
5. Plantsite facilities

Surface mining and in-situ recovery would disturb 27,093 of the 28,800 acres of proposed conversion areas. During steady-state operations, 6,500 acres would be disturbed and unreclaimed at any one time within the proposed conversion areas. Cumulative areas disturbed at one time would be the same as collective, except that the number of disturbed acres would increase a little faster and peak out at 7,050 for 2 to 3 years and then return to 6,500 for the remainder of the project life.

Surface Mining

Surface mining collectively could disturb 21,093 acres and cumulatively disturb 22,493 acres. Surface mining would remove favorable plant growth and overburden, stockpile these materials, remove the tar sand, replace the overburden, dispose of any toxic materials, and regrade the surface.

Because of steep and very steep topography, surface mining would be difficult, requiring intensive procedures to reduce impacts to soils. Specific type and duration of land disturbance would vary, depending on the surface mining sequences, which can now only be estimated.

Surface mining would cause major topographic surface changes that would be in disequilibrium with surrounding areas not being surface mined. Surface mining and the removal of the tar sand from 100 to 500 feet would reduce the average elevation of the land. Even assuming a swell factor of 15 to 20 percent for the expansion of overburden, soil swelling would not compensate for the removal of the tar sand. The reduction of the average elevation would reduce the steepness of slopes in the steep and very steep areas (except for headwall areas) and would alter topography to the extent that surface expressions and aspect would be changed and would have less influence on the diversity of vegetation growth. Surface and topographic changes would

TABLE 3-9
ACRES OF SOIL GROUPS AFFECTED AND DISTURBED
(Proposed Actions)

Project Component	Acres Disturbed[a]	Acreages of Soil Groups Affected and Disturbed A[b]	F	M1	M2	M3	MS1	MS2	MS3	Undetermined[c]
Collective Totals										
Mine (Surface)	21,093	344	0	42	1,557	1,734	28	7,905	9,483	0
Plant and Spent Send Disposal	6,407(267)	302	1,044	0	80	151	936	1,854	2,040	0
Plant and In-Situ Mining	6,000	22	274	478	1,294	6	130	3,307	489	0
Ancillary Facilities	2,445(415)	0	0	0	0	0	0	0	0	2,445
Total Acres Disturbed[d]	35,945	668	1,318	520	2,931	1,891	1,094	13,066	12,012	2,445
Interrelated Projects Totals										
Mine (Surface)	1,400	0	0	0	0	118	0	1,223	59	0
Mine (In-Situ)	0	0	0	0	0	0	0	0	0	0
Plant and Spent Sand Disposal	1,200(200)	0	1,200	12	0	0	0	0	0	0
Ancillary Facilities	300	0	0	0	0	0	0	0	0	300
Total Acres Disturbed[d]	2,900	0	1,200	12	0	118	0	1,223	59	300
Cumulative Total										
Mine (Surface)	22,493	344	0	42	1,557	1,852	28	9,128	9,542	0
Mine (In-Situ)	6,000	22	274	478	1,294	6	130	3,307	489	0
Plant & Spent Sand Disposal	7,607	302	2,244	0	80	151	936	1,854	2,040	0
Ancillary Facilities	2,745(415)	0	0	0	0	0	0	0	0	2,745
Total Acres Disturbed[d]	38,845	668	2,518	520	2,931	2,009	1,094	14,289	12,071	2,745

Note: Figures enclosed by parentheses are acreages removed (plant sites and roads) for life of projects. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of projects.

[b]Includes measured, delineated areas of flood plain soils; additional small areas not mappable due to map scale occur throughout the area of influence.

[c]Acreages not determined because specific locations of facilities are unknown at this time.

[d]Includes disturbance within and outside lease areas to be converted.

strongly affect surface water runoff and water infiltration rates (Section 3.A.1, Water Resources).

The impacts on the microclimate are estimated to be localized and quantitatively unknown. Microclimate changes due to alterations in temperature (aspect related), precipitation, and wind patterns would result from changes in elevation, topography, and surface irregularity. (Surface irregularity would result where surface mining, in-situ recovery, or no mining would occur in adjacent areas.) Microclimate changes would strongly affect vegetation, as discussed in the last part of this section.

The reclamation program would consist of replacing overburden (mainly sedimentary rock) and in some cases spent sand into the pit area or adjacent canyons and covering the overburden with a mantle of soil (favorable plant growth materials) in the proper sequence to provide for a suitable land surface with favorable internal and surface drainage and a favorable medium for plant growth. A concern exists that the area may not have enough suitable plant growth materials to cover the surfaces of the regraded surface mine areas because of the dominantly shallow and moderately deep soils in the mountain area. Extreme care thus must be taken in selecting and storing suitable materials from convex ridges, concave and cove areas, toe slopes and in selecting and storing the suitable finer material created in the overburden removal and placement process. Some steep and very steep localized areas (about 5 to 8 percent) resembling talus-like slopes could remain. These areas would be the same size as preconstruction rock outcrop areas (canyon walls and escarpments).

To provide for better erosion control and revegetation, the greatest slope of the reclaimed land (with the exception of headwall cuts bordering unmined or in-situ recovery areas) as required by BLM, would not exceed 35 percent slope. Slope distances would be no greater than 100 feet (Appendix A-7, Reclamation and Erosion Control Programs).

In-Situ Recovery

Collectively, in-situ recovery would disturb 6,000 acres (Table 1-10, Section 1.H.1), and the building of ancillary facilities would disturb 135 acres. None of the interrelated projects are involved in-situ recovery.

In-situ recovery would be restricted to areas with less than 50 percent slope due to the type of extraction facilities proposed for use. The surface disturbance would consist of vegetation removal and topsoil disturbance in plot-like areas. Accelerated wind and water erosion would occur in these areas during construction and operation (Section 3.A.1, Water Resources). The surface disturbance caused by vegetation removal and the oil recovery facilities and vehicular traffic would remain for 1 to 10 years.

Erosion control, reclamation, and revegetation procedures, which would be implemented in phases throughout the in-situ process, are expected to be successful (Appendix A-7, Reclamation and Erosion Control Programs).

Spent Sand Disposal

Spent sand disposal areas would disturb 7,140 acres, 4,140 acres of which are proposed to be placed outside the STSA, northwest and southwest of Sunnyside (climatic zones B and C, Map 3-2, map pocket of draft EIS), and 1,500 acres of which are proposed to be placed northeast of Patmos Head, in the Range Creek area (climatic zone D). Spent sand occupying 1,500 acres, however, would be returned to the mined-out areas, and no more surface disturbance would result from its disposal.

Vegetation cover and topsoil, including other soil material favorable for plant growth, would be removed from the spent sand disposal area and stockpiled in stages concurrent with project operations. The total area would not be disturbed or covered by spent sand in the early stages of the projects.

The proposed spent sand disposal areas near Sunnyside lie on the gently to strongly sloping alluvial fan formed by mixed alluvial materials derived from sandstone and shale that originated from the bordering mountains. Soils within this area (Ildefonso very stony loam) are mainly deep, loamy soils containing varying amounts of rock fragments (SCS and BLM 1981). Soil material suitable for reclamation exists at these sites and will require proper excavation and handling.

The disposal areas would be reclaimed in stages concurrent with mining throughout the life of the projects. The physical and chemical properties of the spent sand are not known but are believed to have textures that would include sandy loams, fine sandy loams, loamy fine sands, and silts. Salt content is expected to be slight to moderate, having a pH ranging from 6.0 to 8.4. The spent sand is also expected to contain some petroleum residues resulting from extraction.

The surface of sand disposal areas would be stabilized and prepared for plant growth through various reclamation measures (Appendix A-7, Reclamation and Erosion Control Programs). These measures would minimize the problems of making the spent sand favorable for revegetation, especially if the sand has chemical properties that would require intensive measures to be reduced to tolerable levels. To ensure an effective thickness for plant growth, a mantle of at least 12 to 18 inches of suitable plant growth material would be needed (Cook 1974). Spent sand disposal areas within the mountains would need less sideslope area reclamation due to the canyon fill type of disposal.

Ancillary Facilities

The building of right-of-way facilities would collectively disturb 2,445 acres and cumulatively disturb 2,745 acres for 1 to 2 years. Building and installing right-of-way facilities would disturb topsoil, compact the soil, and alter the soil profile along the excavated trench of pipelines and along borrow areas of roads. Accelerated wind and water erosion would occur until erosion control measures are implemented (1 year). In addition, right-of-way facilities requiring access roads for maintenance would create problems in controlling off-road vehicle traffic and minimizing off-road land disturbance. Soil impacts would be considered insignificant because this type of land disturbance is expected to cause only short-term losses.

Plant Facilities

Plantsite facilities proposed by the applicants would collectively disturb 267 acres for the life of the operations (long-term), but this land would be reclaimed upon abandonment. Interrelated project

plantsite facilities and the applicants' proposed facilities would cumulatively disturb 467 acres within the area of influence.

VEGETATION

The proposed actions could cause some significant vegetation impacts, directly related to the types of land disturbance and climatic zones discussed in the previous section on soils. The significance of the impacts and acreage that would be affected would depend on how well proposed reclamation programs (Appendix A-7) are implemented. The significance and amount of the impacts would also depend on mining procedures employed and disturbed acreage. At this time, only worst-case impacts can be projected.

Vegetation could be significantly disturbed in the low precipitation zones (climatic zones A, B, and C) (Map 3-2, map pocket of draft EIS). The applicants' proposed developments would collectively disturb 1,838 acres in these zones, and applicant and interrelated projects would cumulatively disturb 3,038 acres. It might not be possible to establish a ground cover within 5 years.

Another significant impact would involve the inability of reclamation to restore the pre-project diversity of vegetation types. Within surface mined areas (11,651 acres of collective disturbances and 12,853 acres of cumulative disturbances), changes in topography, slope, and aspect would alter the microclimate, which would change plant communities. Some plants that require special conditions, mainly shrubs and trees, would be strongly affected and might not be able to be reestablished on reclaimed areas. Aspen and mixed-conifer types would be most strongly affected. These vegetation impacts would also affect wildlife (Section 3.A.4) and grazing (Section 3.A.9).

The vegetation inventory, forage availability, and revegetation potential information presented in this EIS was gathered from vegetation surveys and the third-order soil survey completed during the 1978 and 1979 field season (SCS and BLM 1981). Vegetation and soils were mapped at a scale of 1:24,000. These maps are on file at the BLM Price River Resource Area Office. More information, including vegetation conditions and vegetation manipulation, was referenced from the Price River Grazing Management Draft EIS (BLM 1982a).

Seven major vegetation types would be affected: pinyon-juniper, desert shrub, sagebrush-grass, mountain shrub, aspen, mixed-conifer, and riparian. Combining several vegetation communities and range sites, these types were identified to evaluate potential impacts and determine revegetation and regeneration potential. Table 3-10 shows estimated areas of each vegetation type that would be disturbed collectively by the applicants' proposed developments and cumulatively by applicant and interrelated projects. A brief description of the types and their use and importance follows.

Riparian (645 acres disturbed collectively, 645 acres disturbed cumulatively).

The riparian vegetation type includes the succulent and woody plants growing along streams. The riparian zone is one of the highest producers of forage per acre and an important wildlife habitat. Riparian vegetation stabilizes stream banks, protects the quality of stream water, and adds to the diversity of an area. Riparian communities in the STSA consist of cottonwoods, aspens, willows, aster, Kentucky bluegrass, western wheatgrass, Woods rose, and a variety of forbs. From 10 to 30 years would be needed for this vegetation type to recover to near preconstruction conditions, but grasses are expected to become adequately established within 5 years. Any loss of riparian habitat would be significant because of criteria in Executive Order 11990.

Desert Shrub (0 acres disturbed collectively, 1,000 acres disturbed cumulatively).

The desert shrub type occurs in the basin areas where annual precipitation is less than 10 inches. Major shrub species include shadescale, winterfat, bindsage, rabbitbrush, black sagebrush, and big sagebrush with a transition to juniper along the eastern edge of this type. Common grasses are Indian ricegrass, galleta, salina wildrye, western wheatgrass, and squirreltail. Forage capacity is most commonly low. (The specific area of this vegetation type affected by the interrelated Chevron-GNC project's spent sand shale disposal area is dominated by big sagebrush.) This vegetation type is used for limited livestock and wildlife grazing.

From 10 to 20 years would be needed for areas of this vegetation type to recover to preconstruction conditions. Grasses and forbs are expected to become adequately established within 5 years.

Pinyon-Juniper (4,672 acres disturbed collectively, 4,872 acres disturbed cumulatively)

TABLE 3-10
ACRES OF VEGETATION TYPES AFFECTED AND DISTURBED
(Proposed Actions)

Project Component	Acres Disturbed[a]	Riparian[b]	Desert Shrub	Pinyon-Juniper	Sagebrush-Grass	Mountain Shrub	Aspen	Mixed Conifer	Undetermined[c]
Collective Totals									
Mine (Surface)	21,093	344	0	659	1,982	8,303	3,552	6,253	0
Plant and Spent Sand Disposal	6,407(267)	279	0	2,864	483	935	295	1,551	0
Plant and In-Situ Mining	6,000	22	0	1,149	2,309	1,844	260	416	0
Ancillary Facilities	2,445(415)	0	0	0	0	0	0	0	2,445
Total Acres Disturbed[d]	35,945	645	0	4,672	4,774	11,082	4,107	8,220	2,445
Interrelated Projects Totals									
Mine (Surface)	1,400	0	0	0	58	140	373	829	0
Plant and Spent Sand Disposal	1,200(200)	0	1,000	200	0	0	0	0	0
Ancillary Facilities	300	0	0	0	0	0	0	0	300
Total Acres Disturbed[d]	2,900	0	1,000	200	58	140	373	829	300
Cumulative Total									
Mine (Surface)	22,493	344	0	659	2,040	8,443	3,925	7,082	0
Mine (In-Situ)	6,000	22	0	1,149	2,309	1,844	260	416	0
Plant and Spent Sand Disposal	7,607(267)	279	1,000	3,064	483	935	295	1,551	0
Ancillary Facilities	2,745(615)	0	0	0	0	0	0	0	2,745
Total Acres Disturbed[d]	38,845	645	1,000	4,872	4,832	11,222	4,480	9,049	2,745

Note: Figures enclosed by parentheses are acreages removed (plant sites and roads) for life of projects. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of projects.

[b]Measured delineated areas of riparian are shown; additional, small areas occur throughout the area of influence that are not mappable due to map scale.

[c]Acreage not determined because specific locations of facilities are unknown at this time.

[d]Includes disturbance within and outside lease areas to be converted.

The pinyon-juniper type occurs in the semidesert and upland zones of the area of influence. Species composition changes with elevation, slope, and aspect. Juniper trees are the major species, but pinyon pine increases with elevation and precipitation to a point where it dominates the upper extremes of the area. Common species include Utah juniper, pinyon pine, black sagebrush, birchleaf mountain mahogany, Mormon tea, big sagebrush, and some Gambel oak. Grasses include salina wildrye, galleta, western wheatgrass, and blue grama. These areas are used for livestock and wildlife grazing. Some trees are used for firewood. Chaining (see Glossary) has been successfully conducted on this vegetation type within the area of influence. The recovery time for this type is predicted to be 30 to 50 years, but grasses and forbs would become adequately established within 5 years.

Sagebrush-Grass (4,744 acres disturbed collectively, 4,832 acres disturbed cumulatively)

Most commonly occurring on benches, mesas, and park-like areas above 6,200 feet, this type has an overstory of sagebrush. The dominant sages are big sage (*Artemesia tridendata*), low sage (*A. arbuscula*), or black sage (*A. nova*). The main understory grasses are salina wildrye, Letterman needlegrass, Thurber needlegrass, and western wheatgrass. These areas provide forage for livestock and wildlife. From 10 to 20 years would be needed for this type to recover from disturbance, but grasses and forbs are expected to become adequately established within 5 years.

Mountain Shrub (11,082 acres disturbed collectively, 11,222 acres disturbed cumulatively)

The mountain shrub type consists of several plant communities that occupy the grassy, convex ridge tops, and brush-covered sideslopes. Most dominant species include mountain big sagebrush, Utah serviceberry, Gambel oak, birchleaf mountain mahogany, cliffrose, Woods rose, snowberry, Letterman needlegrass, needle and thread grasses, bluegrass, slender wheatgrass, western wheatgrass, Indian ricegrass, and forbs. These areas provide forage for livestock and are critical to wildlife. From 20 to 30 years would be needed for areas of this type to recover from disturbance, but grasses and forbs are expected to become adequately established within 5 years.

Aspen (4,107 acres disturbed collectively, 4,480 acres disturbed cumulatively)

The aspen type consists mainly of quaking aspen, cottonwood, mountain shrubs such as snowberry and wild current, mountain brome, and other grasses and forbs. Conifers also occur within the aspen type. This vegetation type is found on north aspects in irregular patterns where there is more moisture. In degraded areas, stands consist of a few old trees and a sagebrush understory.

Aspen sites are of high great importance, producing forage, holding snow on watersheds, and providing a unique microclimate for the characteristic understory. These areas are also critical wildlife habitat.

Disturbed Aspen areas are expected to need 25 to 45 years to recover, although grasses and forbs would become established within 5 years. The preconstruction diversity of occurrence, however, would be altered due to the topographic changes of surface mining.

Mixed-Conifer (8,220 acres disturbed collectively, 9,049 acres disturbed cumulatively)

The mixed-conifer type consists of several plant communities that grow on north-facing, steep-sloping mountain sideslopes and ridges, as well as elevations above 8,200 feet and more moist precipitation zones. Most common species are Douglas fir, Englemann spruce, and some white fir, with an understory of mountain mahogany, snowberry, and fescue.

Most of the mixed-conifer type is used for wildlife habitat and limited grazing. In addition, conifers are used for firewood and poles. Timber stands, which are most common on inaccessible, steep and very steep slopes (30 to 70 percent) lack commercial value (BLM 1980b). From 30 to 50 years or more would be needed for disturbed areas in this type to recover, but an adequate grass cover would be established within 5 years.

THREATENED AND ENDANGERED PLANTS

The Fish and Wildlife Service (FWS) has stated that one federally listed endangered plant could occur on the main block of the STSA—the Uinta Basin hookless cactus (FWS letter, Appendix A-8). Individual plants could be destroyed by construction or trampling or collected by increased visitors who would have access to the area as a result of conversion-related development.

RECLAMATION

Reclamation and revegetation of the surface mine disturbance would be difficult in most of the area. Intensive erosion control, reclamation, and revegetation measures would be needed, especially in areas of very steep slopes and shallow, rocky soils. Soil reconstruction potential for revegetation is poor to fair due to unfavorable soil properties, including a large volume of rock fragments and shallow depths over bedrock.

Moisture is adequate in most of the proposed surface mine area, where average annual precipitation varies from 12 to 30 inches. Most of the proposed mining would occur in the 16- to 30-inch precipitation area.

The applicants' proposed reclamation programs have been evaluated (Appendix A-7, Reclamation and Erosion Control Programs). Applying reclamation measures would make the surface suitable for plant growth, control surface runoff and erosion, and reduce visual impacts. Soil losses are expected to be reduced by (1) implementing erosion control measures, (2) reconstructing the soil (plant growth media), and revegetating understory plants (grasses and forbs) to provide stability and soil protection. Seventy-eight percent of the soils within the area are dominantly shallow to moderately deep over bedrock, contain 15 to 70 percent rock fragments by volume, occur on steep and very steep slopes, and are in land capability Class VII (SCS and BLM 1981). These soils generally are poor sources for large amounts of suitable plant growth materials.

Soil productivity, however, is expected to be reclaimed to preconstruction levels and possibly enhanced if an intensive soil reconstruction and reclamation program is followed. Such reclamation will be possible because of (1) the low preconstruction soil productivity, (2) the proposed reduction of steep and very steep slopes (30 to 70 percent slopes) to slopes of 30 percent and less, and (3) the favorable average annual precipitation throughout most of the proposed conversion areas. At a minimum, reclamation would ensure that a cover would be reestablished over most disturbed areas. Some steep localized areas (about 5 to 8 percent) resembling talus-like slopes could remain, but the size of these areas would be the same as preconstruction rock outcrop areas (canyon walls and escarpments).

Reconstructed slopes would be less than 30 percent, creating more favorable water infiltration rates. Reconstructed soils would generally be deep and would have surface textures ranging from sandy loam to loam with varying amounts of rock fragments. They would have a higher water-holding capacity than the original soils, which would provide for better plant growth conditions that would potentially be more suitable for grass production.

The success of revegetation would depend on the success of restoring and enhancing soil conditions as discussed above. Revegetation potential would be greatest in areas of higher average annual precipitation (see Map 3–2 showing climatic zones). Grasses and forbs are expected to be established within 3 to 5 years, especially in climatic zones C, D, E, and F. Revegetation is more likely to exceed 5 years (which would exceed the significance criteria) in climatic zones A and B. Grass, however, is still expected to be reestablished within the 5-year period with more intensive use of effective seedbed preparation, planting techniques, and soil protection measures. Establishing understory vegetation (grasses and forbs) would successfully stabilize the land surface

In surface mined areas, changes in topography and aspect would change microclimates, which would change plant communities. Surface mining and reclamation would change the mostly steep and very steep preconstruction landscape to a rolling to hilly terrain with reduced aspect influence and reduced elevations (reductions of 200 to 500 feet, depending on the thickness of the tar sand and the overburden replacement). Preconstruction plant diversity requiring specialized microenvironmental conditions could not be reestablished on the reclaimed areas, which would be a significant adverse impact. Shrubs and trees, especially aspen and conifer vegetation types, would be most significantly affected.

Competition with grasses and forbs would also delay the establishment or encroachment of woody plants. Grasses would be a significant part of the reclamation effort. The increased forage production expected from establishing a grass cover would benefit livestock but would harm big game species that are browsers. Some small mammals and birds would benefit from a grass cover, but major ungulates would be adversely affected.

The loss of the natural intricate vegetation diversity due to changes in soils, topography, and microclimate would not reduce production but would change the area's suitability for wildlife habitat and change the area's aesthetic value (Section 3.A.9, Agriculture; Section 3.A.6, Visual Resources; and Section 3.A.4, Wildlife). A change in plant diversity might not result in the elimination of a species, but it could change population levels and distribution. If a species is eliminated, another species is likely to move into the vacant habitat niche.

Spent sand disposal areas would be the most difficult to revegetate. Such areas would need intensive reclamation measures, especially on the sites in climatic zone B. The chemical and physical properties of the spent sand would require special agronomic measures to provide for a favorable plant growth media that can produce a grass-mixed shrub vegetation to stabilize the disposal site (Appendix A–7, Reclamation and Erosion Control Programs).

One of the two proposed disposal sites in climatic zone B would lie in an area where the pinyon-juniper has been chained to provide for a more favorable and productive grass-type vegetation cover. The other site would be located in sagebrush-grass and desert shrub area.

The spent sand disposal sites within the mountain area would be valley fill types and would have only small areas of steep sideslopes. The smoother slopes and more favorable climatic conditions would increase the probability of achieving successful vegetation, so these areas would not require as intensive reclamation measures as the steeper sloping areas.

The 6,000 acres that would be disturbed by the in-situ process are expected to be successfully revegetated due to smoother slopes, higher precipitation, and the type of disturbance.

3.A.4 WILDLIFE

IMPACT SIGNIFICANCE CRITERIA

The adverse impacts to wildlife due to habitat removal and surface disturbances are considered to be significant if they would destroy any crucial habitats (for example, high-priority summer and winter ranges, critical summer and winter ranges, calving/fawning areas, leks, and nesting and brooding areas). Any loss of riparian habitat would be a significant impact because of criteria in Executive Order 11990. The indirect impacts of human population increases are considered to be significant if the estimated increases in poaching, wanton killing, harassment, and illegal purchase (or nonpurchase) of hunting or fishing licenses would exceed by present levels 15 percent. The above statements were developed through professional experience and input from knowledgeable wildlife biologists from the current understanding of critical habitat distribution and use and estimates of local poaching, wanton killing, harassment levels, and fraudulent license purchases.

All big game habitat and harvest data are based on deer herd unit 27B and the Range Creek elk herd unit (UDWR 1983b).

Impacts to threatened or endangered species are considered on a case-by-case basis as part of the Fish and Wildlife Service (FWS) Section 7 consultation process. In this EIS, any impacts to listed species would put the affected species in a "may affect" category, which automatically elevates the anticipated impact into formal consultation with the FWS.

WILDLIFE HABITAT

Primary wildlife habitat types (vegetation types) in the STSA and descriptions of various plant communities within each type are noted in Section 3.A.3, Soils and Vegetation. Table 3-11 lists some wildlife species found in the STSA and their occurrence by habitat type.

Probably the most important wildlife habitat type for animal diversity and density is the aspen type (BLM 1982b), followed closely by the riparian habitat type. In the Aspen type, aspen is noted as a unique and limited, high-value wildlife habitat. The type supports an exceptionally large diversity of wildlife species, particularly nongame birds. Aspen communities are also invaluable for providing big game cover and forage in the summer and fall.

The aspen type occurs on 13,390 acres or 14 percent of the main block. The projects would collectively disturb 4,107 acres (31 percent) of the aspen type in the main block and cumulatively disturb 4,480 acres (33 percent). Even though the aspen type forms only a small portion of the total wildlife habitat, this type is highly important to all wildlife species in this area.

The pinyon-juniper habitat within the main block is important for many wildlife species, including nongame birds. This habitat type also provides critical and high-priority winter habitat for deer as well as habitat for several predator species that prey on the many species of small mammals found there.

The sagebrush-grass habitat type is an interspersed type that furnishes food and cover year round to mule deer, elk, many small mammals, predators, and birds. This type is important for providing forage diversity for grazing and browsing species.

The mountain shrub habitat type is occupied by several big game species, large predators, and many rodents and small, nongame birds. Its lower elevations provide winter cover.

Typical of the north slopes and higher elevations in the main block, the mixed conifer type furnishes thermal cover for big game and nesting habitat for many small birds and raptors. Big game use this type for cover rather than for foraging. Other species such as blue grouse, snowshoe hares, and raptors depend upon this type for most of their life cycle requirements.

Though occupying only a small part of the main block, the riparian habitat type is extremely important to many wildlife species, particularly small nongame birds and small mammals. Big game, raptors, and small predators also heavily use this type.

The proposed actions are expected to have significant adverse direct and indirect impacts on wildlife habitat. Habitat would be directly destroyed by mining, spent sand disposal, and the construction of processing plants and ancillary facilities. The "zone of influence" around the mining area would not physically remove habitat but would make habitat temporarily unusable by wildlife because of isolation, noise, and dust. In addition, aquatic habitat would be directly disturbed in streams subject to flow depletion, water quality change, or temperature change.

TABLE 3-11
SELECTED TERRESTRIAL AND AQUATIC SPECIES AND THEIR PREFERRED HABITATS IN THE AFFECTED AREA[a]

	HABITAT TYPE[b]						
Species	**Pinyon-Juniper**	**Sagebrush-Grass**	**Mountain Shrub**	**Aspen**	**Mixed Conifer**	**Riparian**	**Aquatic**
Big Game							
Mule Deer	X	X	X	X	X	X	
Wapiti (Elk)	X	X	X	X	X	X	
Black Bear	X	X	X	X	X	X	
Mountain Lion	X	X	X	X	X	X	
Small Mammals							
White-tailed Jackrabbit	X	X	X				
Black-tailed Jackrabbit	X	X	X				
Snowshoe Hare			X	X	X	X	
Mountain Cottontail		X	X				
White-tailed Prairie Dog	X	X					
Uintah Ground Squirrel	X	X	X				
Northern Pocket Gopher			X	X	X		
Deer Mouse	X	X	X	X			
Coyote	X	X	X	X	X	X	
Red Fox	X	X	X	X	X	X	
Badger		X	X	X			
Bobcat	X	X	X			X	
Birds							
Sage Grouse	X	X	X			X	
Blue Grouse		X	X	X			
Mourning Dove	X	X	X			X	
Great Horned Owl	X	X	X	X	X	X	
Cooper's Hawk	X	X	X	X	X	X	
Golden Eagle	X	X	X			X	
Ferruginous Hawk	X	X					
Prairie Falcon	X	X	X				
Mountain Bluebird			X	X	X		
Green-tailed Towhee	X	X	X				
Sage Sparrow	X	X					
Mallard						X	X
Threatened or Endangered Federal List							
Bald Eagle	X	X				X	X
Peregrine Falcon		X	X	X	X	X	
Black-footed Ferret	X	X					
Colorado Squawfish							X
Aquatic Species							
Cutthroat Trout							X
Rainbow Trout							X
Brook Trout							X
Utah Chub							X
Flannelmouth Sucker							X

[a]Preferred habitats by species based on **Vertebrate Species of Southeastern Utah** (Dalton et al. 1978).
[b]Refer to Section 3.A.3, Soils and Vegetation, for a description of the various vegetative types.

Collectively the proposed actions would disturb 6,500 acres at any one time (Table 2-1, Chapter 2) and 35,945 acres over the life of the projects. Interrelated projects and the proposed actions would cumulatively disturb 38,845 acres of habitat. Cumulative acres disturbed at one time would be the same as collective, except that the number of disturbed acres would increase a little faster and

peak at 7,050 for 2 to 3 years and then return to 6,500 for the remainder of the project life. Wildlife carrying capacity for various species would decline as a result of the loss of this habitat. Indirect habitat losses in the zone of influence cannot be quantified at present levels of knowledge, as each species has its own tolerance for human activities, and most of these tolerances are not known. Direct losses, however, would amount to 6,500 acres at a time.

TERRESTRIAL WILDLIFE

On long-term projects where reclamation occurs concurrently with mining on adjacent lands, habitat disturbance is analyzed in two ways. First, the total acres disturbed at any one time is determined. This habitat is unusable by the current resident wildlife because it has been altered. Second, the total acres of habitat disturbed over the life of the projects is determined. This habitat, though reclaimed to some type of vegetation cover, has not returned to preconstruction levels of production or diversity and remains below preconstruction carrying capacity for certain species.

Reclamation is expected to reestablish understory plants within 5 years, but complete vegetation recovery to preconstruction production levels would take 20 years or more (see Section 3.A.3, Soils and Vegetation). Initial reclamation would stabilize soil and establish ground cover. Reseeded plants would replace destroyed native wildlife forage and cover (bitterbrush, mountain mahogany, coniferous cover) but would not become established or productive for 20 years or more. Therefore, impacts to existing wildlife habitats would be greater, longer lasting, and more encompassing than if determined only by acres disturbed at any one time. Estimates based only on maximum habitat disturbed at any one time are misleading and mask the total time needed to reestablish wildlife habitat to preconstruction productivity.

Big Game

Mule deer are widespread throughout the STSA and surrounding areas. The STSA lies in Utah Division of Wildlife Resources (UDWR) deer herd unit 27B, and population estimates, harvest levels, and seasonal ranges considered in this EIS are based on data for this unit. Mule deer herds in this area are believed to be below carrying capacity but are slowly increasing in size (UDWR 1982).

Table 3-12 lists seasonal ranges in deer herd unit 27B, periods of use, acreages, and current population estimates. Limited wildlife studies have found no fawning areas in the STSA, but deer are presumed to give birth at the upper levels of winter range between May 15 and July 15. Critical winter range usually lies on benches and canyons at lower elevations of deer range between 6,000 and 7,500 feet. Wildlife studies have found no migration routes to and from winter ranges in the STSA. Of the 266,944 acres of high-priority summer deer range in the herd unit (Table 3-12), 88,926 acres occur in the main block (Map 3-3, map pocket of draft EIS). In this part of Utah, summer range for deer and elk is the limiting habitat type. Development of the proposed conversion leases would collectively disturb 27,296 acres or 10.2 percent of this type of deer range in the herd unit. About 30,196 acres of this type of deer range (11.3 percent) would be cumulatively disturbed by conversion-related development and interrelated projects (Table 3-13).

The impacts on the STSA are not an isolated phenomenon within herd unit 27B but are in addition to all other existing or planned impacts. A comparison of only 88,926 acres of summer range within the main block to the collective and cumulative losses expected in the STSA reveals that losses of this crucial habitat would be 31 percent collectively and 34 percent cumulatively.

Mining and loss of habitat would displace some mule deer from the main block into surrounding areas, resulting in population losses due to increased competition and stress. The mule deer loss would actually be much larger than the initial number of animals displaced because the offspring of these animals and later offspring would also be lost to hunters and nonconsumptive users.

The proposed actions would annually displace 2 percent of the deer in herd unit 27B into adjacent areas. Because preconstruction forage production would not be reached for 20 or more years (see Section 3.A.3, Soils and Vegetation), the potential exists to displace 11 percent of the deer herd. If the nearby areas are at carrying capacity, from 2 to 11 percent of the mule deer in the herd unit could be lost over the life of the projects. Habitat would be disturbed over a 74-year period, and some areas would not return to preconstruction production levels for 20 years or more beyond this period.

More importantly, subtle biotic factors make specific portions of mule deer summer range more important

TABLE 3-12
BIG GAME SEASONAL RANGES, ACREAGES, USE PERIODS, AND CURRENT POPULATION ESTIMATES WITHIN THE AREA OF INFLUENCE

Species and Area	Season of Use	Period of Use	Acreage[a]	Current Population Estimate[a]
Mule Deer Herd Unit 27B[b]	High Priority Summer	May 16 to Oct 31	266,944	11,100
	High Priority Winter	Nov 1 to May 15	628,324	4,700
	Critical Winter	Nov 1 to May 15	125,406	6,400
	Yearlong	Jan 1 to Dec 31	1,074,148	11,400
Elk Range Creek Unit[b]	Summer	May 16 to Oct 31	80,640	100 (estimate 10% of carrying capacity of Unit)
	Winter	Nov 1 to May 15	199,296	

[a]Personal communication, Larry Dalton, Game Biologist, Utah Division of Wildlife Resources, Price, Utah.
[b]From big game management unit maps, Utah Division of Wildlife Resources, Salt Lake City, Utah.

than others, even though the entire range may appear to be almost homogenous in composition and structure. If the 11 percent of the summer range impacted constitutes the entire fawning habitat for the deer herd, then losses would be significantly more severe than an 11 percent loss of habitat would appear to cause. This same rationale holds true for other seasonal ranges.

Mule deer losses would also increase due to increased automobile traffic, harassment, wanton killing, and poaching. By 1990 these losses are expected to increase by 26 percent over present levels (based upon human population projections in Table 3-5, Section 3.A.2, Socioeconomics) as a result of the collective effects of the proposed actions. Considering the interrelated projects in addition to the proposed actions, by 1990 cumulative losses would increase by 53 percent over present levels. These estimated increases in game law violations (poaching) would require an increase in the number of game wardens, which would increase the cost of these projects to the UDWR.

Table 3-14 (Section 3.A.5, Recreation Resources), shows the area's popularity for mule deer hunting areas as evidenced by estimated harvest, hunting pressure, and expenditures from 1978 to 1982. According to this data developed by the UDWR, 10,286 mule deer hunters spent $2,915,777 in the Carbon County during the 5-year period. An 11 percent reduction in deer herd size as a result of proposed tar sand developments could reduce monies spent by deer hunters in Carbon County. Hunters would continue hunting but in other counties having larger deer herds.

The main block has both summer and winter elk ranges and calving areas. The use period for summer ranges occurs mainly from mid-May to the end of October. Winter range use occurs from November 1 to mid-May (Map 3-4, map pocket of draft EIS). Calving takes place mainly between May 20 and July 1. The elk population in the main block is believed to be increasing, but it is newly established and most potential elk winter range is unoccupied. Summer elk range lies above 8,500 feet in elevation and is also not fully occupied. Migratory routes between the seasonal ranges are not well defined.

The main block lies in the Range Creek elk herd unit (UDWR designation), and has 62,956 acres of the

TABLE 3-13
WILDLIFE HABITAT DISTURBANCES
(Proposed Actions)

	Collective Disturbance		Cumulative Disturbance	
Habitat Type	**Acres**	**Percent of Herd Unit**	**Acres**	**Percent of Herd Unit**
Acres Disturbed in the STSA	35,945	NA	38,845	NA
Mule Deer Habitat				
High Priority Summer Range	27,296	10	30,196	11
High Priority Winter Range	1,500	<1	3,839	1
Elk Habitat				
High Priority Summer Range	18,301	23	30,244	38
High Priority Winter Range	10,495	6	14,765	8
Black Bear and Mountain Lion Yearlong Range	35,945	2	38,845	3
Feral Horse Range	6,320	NA	10,760	NA
Small Mammal Habitat	35,945	NA	38,845	NA
Reptile Habitat	35,945	NA	38,845	NA
Sage Grouse Habitat				
Yearlong	9,980	NA	9,980	NA
Nesting	557	NA	557	NA
Forest Grouse Habitat	35,945	NA	38,845	NA
Non-game Bird Habitat	35,945	NA	38,845	NA

Note: NA = not applicable to the deer herd unit; < = less than.

unit's 80,640 acres of high-priority summer elk range (Table 3-12). The proposed actions would collectively and directly disturb 18,301 acres or 23 percent of the elk summer range in the herd unit. The proposed actions and the interrelated projects would cumulatively and directly disturb 30,244 acres or 38 percent of the elk summer range in the herd unit.

Human activities associated with mining and the loss of habitat would displace 10 percent of the elk in the main block on 6,500 acres per year. Since preconstruction forage production would not be attained for 20 years or more (see Section 3.A.3, Soils and Vegetation), 23 percent of the elk could potentially be displaced into nearby areas. At present population levels in the herd unit (Table 3-12), this impact would be insignificant. Because this elk herd is just becoming established, however, any adverse impacts to this population has the potential to reduce herd numbers below the viable threshold. In these cases, production could not overcome natural mortality, and the population would slowly disappear. The UDWR's long-range plan for this elk unit is to increase the herd to a huntable size. Implementing the proposed actions would increase the number of years needed to reach this herd objective and would reduce income and harvest.

TABLE 3-14
HUNTER PARTICIPATION IN CARBON COUNTY, UTAH (1978-1982)

Item	Total Participants	Hunter Days	Animals Harvested
Big Game[a]			
Mule Deer	10,286	41,952	3,006
Black Bear	14	77	6
Mountain Lion	24	134	17
Upland Game[b]	27,025	89,167	131,019
Waterfowl[c]	1,196	4,870	9,199
Waterfowl[d]	780	2,413	3,817

Note: Data for this table were developed from various reports derived by the Utah Division of Wildlife Resources for the 1978-1982 period.
[a]No open seasons on elk or bighorn sheep in this area.
[b]Includes 9 species of upland game.
[c]Includes both duck and goose hunters in Carbon County.
[d]Includes only data from the Desert Lake Waterfowl Management Area in Emery County for duck and goose hunters.

Deer herd unit 27B is known as an excellent area to hunt both black bear and cougar, and 25 percent of the yearly statewide cougar harvest is taken from this unit (UDWR 1983b). Since both bear and cougar tend to shun human activities, mining in the main block would push resident and transitory bears and cougars out of the area and reduce harvests and opportunities for nonconsumptive use in the STSA for the life of the projects.

Rocky Mountain bighorn sheep occasionally visit the eastern portions of the STSA, being most commonly found in Rock Creek, Jack Creek, Flat Canyon and on Steer Ridge. The proposed actions would not directly disturb bighorn sheep range, but secondary impacts such as traffic, harassment, and poaching could force sheep to abandon current ranges west of the Green River and north of Interstate 70 (UDWR 1983b). These sheep do not have a strong population in this area, and disturbances could jeopardize the existing population.

Small Game and Furbearers

Two subspecies of cottontail rabbits occur in the STSA. The mountain cottontail inhabits year round loose rock areas and areas along cliffs in sagebrush and mountain shrub areas at elevations between 6,000 and 9,000 feet. The desert cottontail inhabits the open plains, foothills, and low valleys in the more open mixed desert shrub areas. These two subspecies provide sport hunting for many people, as evidenced by the $1,302,080 spent by 9,381 cottontail rabbit hunters in Carbon County from 1978 to 1982 (Table 3-14, Section 3.A.5, Recreation Resources).

The collective disturbance of 35,945 acres of wildlife habitat would result in losses to cottontail rabbit populations. If cottontails are assumed to occur equally over their habitat in the main block, losses due to mining can be estimated at 43 percent of the main block cottontail population. Cumulative impacts of the proposed actions and interrelated projects are expected to disturb 38,845 acres of cottontail rabbit habitat, which could reduce the cottontail population by 46 percent.

Snowshoe hares, which inhabit the aspen-conifer zone of the mountainous areas within and near the main block, attracted 910 hunters, who spent $99,499 in Carbon County from 1978 to 1982 (Table 3-14, Section 3.A.5, Recreation Resources). The proposed actions would collectively disturb snowshoe hare populations on 16,571 acres or 31 percent of their habitat. The proposed actions and interrelated projects would cumulatively disturb 20,542 acres or 38 percent of showshoe hare habitat.

Though these losses would appear to be heavy, the high reproductive potential of these species would enable them to quickly repopulate the area after reclamation. Habitat for snowshoe hares, however, would take a much longer time to develop. Because many of the steeper, conifer-covered slopes would be altered, snowshoe hare habitat may never develop again in the affected area, and this species may be eliminated from the main block.

A large variety of furbearers and predators and at least 82 small mammal species occur in and near the main block (Dalton and others 1978).

Removal of most of the topsoil and favorable plant-growth material on 35,945 acres and storage of this material for later reclamation would cause direct mortality to small burrowing rodents and along with other mining activities would displace more-mobile animals. On 35,945 acres small mammal losses would be heavy over the life of the projects, but the high reproductive potential of these species would help them rapidly repopulate the reclaimed mine areas. If the various species are assumed to be evenly spaced within the affected area, 43 percent of the main block's small mammal population would be lost due to the proposed actions. Interrelated projects and the proposed actions would cumulatively disturb and result in a loss of 46 percent of small mammal populations. The revegetation of mined out areas to a grass complex could also result in a change in small mammal species because small mammals that frequent shrub habitat would not return to a reclaimed area planted to grass (Schroeder 1978).

Reptiles and Amphibians

The main block has 15 reptile species but not a large population. Because the area lacks aquatic habitat, amphibian numbers are relatively low, and only an estimated five species occur here (Dalton and others 1978).

The main reptile species that might be harmed by the proposed actions include sagebrush lizards, side-blotched lizards, night snakes, and gopher snakes. No data exists on population densities of these species for this area of Utah. If reptiles are assumed to space themselves equally over the 35,945 acres that would be disturbed by the proposed actions, collective losses of these species could total 43 percent of the reptile population on the main block. The cumulative losses of these species on 38,845 acres could total 46 percent of the main block population.

Little aquatic habitat exists for amphibians in the main block. The Grassy Trail Creek area has the most wet areas and riparian vegetation. For this watershed alone, all of the 23 known springs would be lost due to the collective impacts of the proposed actions.

One spring is predicted to be lost in Range Creek and none would be lost in tributaries to the Green River. These two areas have 38 known springs (Section 3.A.1, Water Resources). On the basis of this knowledge, the proposed action would collectively destroy 3 percent of the amphibian habitat in the main block and could reduce the amphibian population by at least 3 percent. Impacts to springs and aquatic habitat around springs due to the cumulative impacts of the proposed actions and interrelated projects would be similar (Table 3-2, Section 3.A.1, Water Resources).

Birds

An estimated 243 species of birds are found in the STSA, of which 236 species are not hunted. The mourning dove and ring-necked pheasant are the major game birds found in and near the main block (Table 3-11). The pheasant occurs only in the agricultural areas around Price and along the Price River and not within the main block. Conversion to homesites and other urban developments, however, would cause the loss of 2,826 acres of agricultural lands, including 933 acres of cropland, that support certain wildlife species (ring-necked pheasants, nongame birds, and some waterfowl). This loss would involve 17 percent of this type of wildlife habitat in the Price-Wellington-Sunnyside area and would amount to a significant reduction in this habitat type. Sage grouse is the major game bird that could be significantly affected by the proposed actions.

Sage grouse populations in Carbon County have been slowly declining over the past 3 years (BLM 1983, UDWR 1983), and sage grouse hunting was closed in Carbon County during 1981 and 1982. Sage grouse are found on the STSA year round, and much of the area is of critical importance to sage grouse as strutting grounds, nesting and brooding habitat, and wintering areas (Map 3-4, map pocket of draft EIS).

The STSA has 46,534 acres of yearlong habitat for sage grouse, including 15,104 acres of nesting habitat associated with six known strutting grounds (leks) (Map 3-4, map pocket of draft EIS). The proposed actions and interrelated projects would cumulatively destroy 9,980 acres of yearlong habitat (21 percent of this habitat in the STSA) and 557 acres of nesting habitat (4 percent of this critical habitat in the STSA). In addition, the local population of sage grouse associated with the breeding habitat

would be lost. The loss of this breeding population of sage grouse would significantly reduce Carbon County's grouse population, which is already declining (UDWR 1983).

Impacts of the proposed actions would violate sage grouse management practices, adopted by the Western States Sage Grouse Committee (1982) and BLM. These guidelines should be considered because they are needed to protect and improve sage grouse habitat.

The proposed actions would disturb 35,945 acres of blue grouse and ruffed grouse habitat within the main block. This disturbance would involve 43 percent of the main block's forest grouse habitat and could lead to a 43 percent reduction in this area's forest grouse population. Interrelated projects and the proposed actions would cumulatively disturb 38,845 acres (46 percent) of such habitat (Table 3-13).

Upland bird hunting in Carbon County would be degraded by an influx of 13,950 mine workers, their families, and people associated with support facilities and residential construction. Hunting pressure would increase by 42 percent due to the collective effects of the proposed actions and 83 percent due to the cumulative effects of the proposed actions and interrelated projects. (See Section 3.A.5, Recreation Resources, for a further discussion of hunter competition.)

Nongame birds vary from warblers to juncos, all of which probably nest in varying numbers within the main block. The most widespread, small, nongame species within the area of influence are the horned lark and Brewer's sparrow.

The mountain bluebird, the western bluebird, and the yellow-breasted chat, which are found in the STSA, are of high interest to the UDRW, mainly due to habitat loss and a resulting population decline. Collectively, the proposed actions would disturb 35,945 acres of habitat in the STSA, reducing total habitat by 43 percent. Cumulatively, the interrelated projects and proposed actions would disturb 38,845 acres, a 46 percent reduction in habitat.

According to the UDWR, the proposed actions might jeopardize the well-being of five other species in the STSA—the common nighthawk, hairy woodpecker, Bewick's wren, golden-crowned kinglet, and vesper sparrow. The proposed actions would collectively disturb 35,945 acres and could reduce populations of these birds by 43 percent. Cumulative impacts might reduce habitats by as much as 46 percent.

No systematic raptor inventories have been completed on the STSA to date, but general distribution maps of raptors show that as many as 29 raptor species could occur on the main block at some time of the year. The proposed actions would collectively disturb 35,945 acres of raptor nesting or hunting habitat, 43 percent of such habitat in the STSA. The proposed actions and interrelated projects would cumulatively disturb 38,845 acres or 46 percent of the STSA raptor nesting and hunting habitat.

Because raptors are protected under several federal laws (Bald Eagle Protection Act, Migratory Bird Treaty), any nest disturbance must be cleared with the Fish and Wildlife Service. Significant impacts, especially to cliff-nesting raptors, are expected throughout the life of the projects. In some areas, cliff-nesting sites would be irretrievably lost, and species nesting there would have to find nesting sites away from the main block. If adjacent breeding territories are at carrying capacities, displaced raptors could be lost from the breeding population.

Wild Horses

The Range Creek Planning Utit has an estimated 25 wild horses (1984 counts), and the early 1990 management level population is projected at 50-100 head. The proposed actions would disturb most of the 6,320 acres of wild horse range in the northeast portion of the main block (Map 3-3, map pocket of draft EIS). Though these 6,320 acres make up only 10 percent of the wild horse range in the Range Creek Planning Unit, 90 percent of the horse observations have occurred in the potential disturbance area, as do foaling and critical water supplies. By disturbing this area, the proposed actions could significantly disturb the area's wild horse population.

Feral Dogs

The human influx to the area could also increase the possibility of domestic dogs running wild in packs that could harass wildlife, especially big game on their winter ranges. Feral dog attacks could result in population losses to some wildlife species. Control of these feral dog packs would be the responsibility of both the UDWR and county or local animal control agencies.

AQUATIC WILDLIFE

The streams in the main block support a sport fishery of brown, rainbow, and cutthroat trout in suitable habitat. The fishery is small but of local importance. Twenty fish species could occur in the area of influence.

Grassy Trail Creek supports trout fisheries that could be harmed by tar sand development. The UDWR plans to manage Grassy Trail Creek Reservoir for its brown trout fishery and is negotiating with Kaiser Steel for public access to the reservoir. Brown trout spawning habitat occurs on both the Right and Left Forks of Grassy Trail Creek, and spawning has been documented in both streams. Below the reservoir, Grassy Trail Creek has a self-sustaining rainbow trout fishery, which would be degraded by deteriorating water quality. Moreover, upgrading the road in Whitmore Canyon would increase traffic and fugitive dust, which would also degrade Grassy Trail Creek below the reservoir.

The hard-to-reach upper portions of Range Creek support an excellent fishery, while Rock Creek supports a fair fishery, and Nine Mile Creek is rated as poor. The Green River is also rated as a fair fishery but has poor access. Cold water fishery habitat may exist in Flat Canyon. Trout have been seen in lower stretches, and young-of-the-year may have been seen in the upper reaches.

The UDWR stocks none of the perennial stream reaches in the main block (UDWR 1983a). Because these streams are self-sustaining and of local importance, an influx of people to this area due to the proposed actions could easily destroy fishing. The increased demand for trout fishing could severely tax UDWR's ability to stock catchable trout to satisfy this demand. The increased need for law enforcement for the more popular waters could also place a burden on UDWR. In addition, increased siltation and introduction of warmer water from mining could eliminate the present, limited, cold water fishery. After mining is completed, the streams left in the main block might never support a cold water fishery.

Because the lower sections of the Price River experience severe flow depletions, releases from Scofield Reservoir might need to be increased during low flow periods to meet water demands of the proposed projects. Eleven miles of the Price River below the reservoir (sections 8 and 9) are rated as Class II cold water fisheries. Only 308 miles of Class II waters exist in Utah. Class II waters are highly productive and are important to the state's sport fishery. This stretch of water supports about 1,020 fish per mile. Increased releases from Scofield Reservoir could significantly impair this fishery. Spawning and nursery habitat could be disturbed by high flows, and angler success could greatly decline. These would be indirect impacts of project development.

Increased demands on the wildlife resources of Utah are ultimately UDWR's responsibility.

Threatened or Endangered Species

Four federally listed endangered animal species could occur on the main block: bald eagle, peregrine falcon, black-footed ferret, and Colorado squawfish (FWS letter, Appendix A-8). No threatened species are found in this area.

Although bald eagles concentrate along the Green River during the winter, using cottonwood trees in the riparian habitat for roosting and perching, they are not expected to be directly affected by the proposed tar sand developments. Wintering eagles, however, are highly susceptible to wanton killing. Large human population increases would increase the size of this problem. By using a straight-line projection, wildlife specialists estimated that collectively, the proposed actions would result in the increase of the wanton killing of bald eagles by 42 percent by 1990, and that cumulatively, the proposed actions and interrelated projects would cause an estimated 83 percent increase in such wanton killings by 1990. The Green River, however, has limited access, and new access is not proposed. The increase in wanton killing, therefore, would be less than under a straight line projection.

The presence of whitetail prairie dog colonies in Carbon County could indicate that habitat exists for the black-footed ferret. Historically, this endangered animal ranged into northeast Utah (Hall and Kelson 1959; Gates 1973) and could still exist there. In 1982 two sighting were confirmed in Grand County near Cisco and Crescent Junction (Jobman and Anderson 1984). If ferrets are present, they could be killed by construction wherever prairie dog colonies occur on or along project construction areas. Present ferret numbers are thought to be so low that any mortality would significantly reduce them.

The peregrine falcon may occur in the STSA as a winter resident or as a migrant; as such, it could be affected by the proposed actions.

The Colorado squawfish has been reported from the Green River. According to correspondence from the Fish and Wildlife Service (Bolwahnn 1983), any project that uses water from any stream in the upper Colorado River system would harm this endangered fish. The size of the impacts to this fish from the Sunnyside Project cannot be reliably estimated with current project data, but any reduction in squawfish populations would be significant because current population levels are low.

Current project descriptions lack enough information to enable BLM to fully determine if tar sand development and its potential use of water from the Green River would jeopardize the Colorado squawfish's existence. BLM must, therefore, request Section 7 consultation on certain species on a project-by-project basis as each commercial mine plan of operations is developed and submitted. As a standard measure, BLM will stipulate special provisions in all lease documents concerning re-initiation of Section 7 consultation (see Appendix A-3, Existing Oil and Gas Provisions and Required General Measures Designed to Reduce Impacts).

The Fish and Wildlife Service lists two birds, one mammal, and one fish as candidate species for threatened or endangered designation: long-billed curlew, ferruginous hawk, spotted bat, and razorback sucker (FWS letter, Appendix A-8).

3.A.5 Recreation Resources

IMPACT SIGNIFICANCE CRITERIA

Impact analysis for recreation resources is related to user expectations, recreation opportunities, and recreation settings. These three factors determine whether experiences are of high quality and positive or of low quality and negative. Impacts to recreation resources are considered to be significant if any of the following criteria are met:

(1) If the user public's short-term sensitivity and perceived concerns about construction are high (where the quality of the recreation experiences would be diminished). Short-term is defined to be 1 to 10 recreation seasons.

(2) If the user public's long-term sensitivity and perceived concerns about project operation is medium to high (where the quality of the recreation experience would fail expectations). Long-term is defined to be 10 years or longer.

(3) Closing access to favored dispersed recreation areas or possibly precluding a portion of the Green River from potential wild and scenic river designation would also be considered significant.

Short- or long-term recreation impacts that are not controversial to the user public would be considered insignificant. For example, impacts to an area not regularly used or not considered of high recreation value would be considered insignificant.

GENERAL DISPERSED RECREATION

The primary form of recreation within the area of influence involves such dispersed experiences as sightseeing, hunting, camping, off-road vehicle (ORV) use, fishing, and floatboating on the Green River.

The proposed actions would diminish the recreation resource and lower the quality of dispersed recreation experiences largely by changing access, reducing the recreation land base, and increasing recreation use due to project-induced population growth. Recreation opportunities that would be severely diminished or eliminated by proposed lease operations would eventually be shifted to nearby public, national forest, state, private, and Indian reservation lands.

Over the 74-year collective life of the projects, the proposed actions would disturb 35,945 acres. Over a 40-year period, 6,500 acres at any one time would be eliminated from dispersed recreation opportunities. Within the STSA, recrecreationists engage in approximately 6,000 visitor days each year. The interrelated projects and the proposed actions would cumulatively disturb 38,845 acres over the length of the projects. The cumulative acres disturbed at one time would be the same as the collective acres disturbed, except that the number of disturbed acres would increase a little faster and peak out at 7,050 for 2 to 3 years and then return to 6,500 for the rest of the project life.

Bruin Point View Area

Located next to the Amoco, Mono, and Enercor proposed conversion areas, the 10,285-foot-high Bruin Point provides an excellent view of nearby and distant canyons and mountains. The area is used for picnicking, sightseeing, and dispersed camping and hunting. It received an estimated 1,000 visits in 1982. Most use occurs during midsummer and early fall. Recreation use of Bruin Point largely depends on road and weather conditions (BLM 1983b).

Extensive surface disturbance on the Amoco, Mono, and Enercor proposed conversion tracts would significantly reduce the suitability of Bruin Point for sightseeing, hunting, camping, and ORV use opportunities. Surface mining might also block public access to Bruin Point as well as areas to the west and north that are used mainly for hunting and other dispersed recreation.

Hunting and Nonconsumptive Uses of Wildlife

Nearly all big game hunting in the area of influence is for deer. In 1982, 1,659 hunters were afield within the STSA, most because of good public access to the higher elevation summer range. The primary access from Sunnyside is a partially paved but mostly dirt jeep trail up Water Canyon to Bruin Point. Hunters also gain access to the main block via Dry Canyon Road and Cottonwood Canyon. Hunting is closely associated with dispersed camping during hunting season. The STSA also has a large amount of small game habitat, especially snowshoe hare habitat.

Hunting, fishing, and nonconsumptive uses of wildlife in Carbon County furnish many days of leisure to both residents and non-residents. Table 3-14 shows estimates of total participants, animals harvested, and participant days.

In spite of present low populations, the mule deer is an important trophy and game species in Carbon County. In addition to its trophy value, the mule deer is of economic importance because of the numbers of hunters who come to the area. From 1978 to 1982, deer hunters spent 41,952 days pursuing deer in Carbon County while harvesting 3,006 animals. The food value of the animals harvested in that period amounted to 300,600 pounds of meat.

Other big game animals hunted in the STSA include the black bear and cougar, which furnished 211 hunter days for 38 hunters, who harvested 23 animals.

From 1978 to 1982 in Carbon County, 27,025 hunters spent 8,967 days harvesting 131,090 animals from nine small game species, and 1,976 hunters spent 7,283 days harvesting 13,016 ducks and geese.

Of the 22,179 residents of Carbon County in 1980, 30 percent (6,654 persons) were engaged in nonconsumptive uses of wildlife (birdwatching, wildlife observation) in the county (Allred 1976). Nonconsumptive users of wildlife are expected to increase to 19,212 by 1989 and to 20,448 by 1995.

Though leisure-time uses of wildlife are expected to increase, overall wildlife use and the removal or change in habitats could decrease wildlife populations to the extent of reducing even under present levels the number of persons involved in wildlife pursuits. These reductions could lower potential benefits from wildlife over the long term. (See Section 3.A.4, Wildlife, for a more detailed discussion of the expected impacts to wildlife.)

The proposed actions' effects on hunting and nonconsumptive wildlife uses would largely depend upon the effects to access and wildlife. Developing the proposed conversion tracts and the associated surface disturbance (from plantsites, spent sand disposal areas, and ancillary facilities) would largely alter or eliminate user access. Heavy construction equipment would clog the partially paved but mostly dirt jeep trail from Sunnyside up Water Canyon to Bruin Point and beyond, threatening the health and safety of recreationists on this primary access route to higher elevations. Surface mining would reduce summer deer habitat, thereby reducing herd populations. Poaching and other game law violations are expected to greatly increase (Bradley 1976).

Additionally, project-related population growth would increase hunter contact throughout the area of influence, which would cause a decline in hunting success and hunter satisfaction. Increased hunting could increase hunting accidents. In addition, hunting pressure and other dispersed recreation opportunities could increase on nearby national forests (Ashley, Fishlake, and Manti-LaSal); public, state, and private lands; and the Uintah and Ouray Indian Reservation due to an overall decline in hunting opportunities and the quality of the hunting within the STSA.

Sightseeing

Sightseeing is another popular recreation activity. An abandoned tar sand tramway (cable car) in Water Canyon provides an interesting sightseeing opportunity. Built in 1929, the tramway lies 2 miles north of Sunnyside. Hiking, backpacking, and ORV travel provide high quality sightseeing experiences due to the variety of landforms and vegetation. Tributary canyons to Desolation Canyon, such as Rock Creek, Flat Canyon, and Jack Creek, are the area's most scenic attractions because of their landforms, uniqueness, color, water, and vegetation.

Land disturbance and changes in access would significantly alter sightseeing opportunities. Previous semi-primitive recreation experiences would shift to more semi-urban recreation experiences, but new or improved access routes could provide more opportunities for sightseers and ORV users. Moreover, mining and the processing plants would become new attractions for sightseers.

Fishing and Floatboating

Fishing within the area of influence usually occurs in association with floatboating on the Green River. The Green River provides fishing opportunities for trout and catfish. Both Rock and Range creeks provide good quality trout fishing. Fishing on Rock Creek is accessible to floatboating parties and people using the Van Duesen Trail from the T.N. Jensen and Don Wilcox lodges, but the Rock Creek fishery is minor. Fishing on Range Creek is accessible by the Little Horse Canyon and Bruin Point roads.

The Green River through Desolation and Gray canyons, 7 miles east of the STSA, is recognized nationally for its high-quality wilderness floatboating. The 1981 visitor use estimate for Desolation Canyon was 31,815 user days (BLM 1983b).

Both the Green River, from Range Creek upstream to the Yampa River (193 miles), and Range Creek, from the Green River to its source (34 miles), have been identified as having national significance and as potential candidates for wild and scenic river status in the Nationwide Rivers Inventory (National Park Service (NPS) 1982). Rivers on the Nationwide Rivers Inventory have been selected after consideration of the degree to which they are free flowing, the degree to which the river and corridor are undeveloped, and the degree to which outstanding natural and cultural characteristics occur along or near them.

A study report and final EIS for the Green and Yampa wild and scenic rivers proposal was sent by the Secretary of the Interior to Congress on November 14, 1983. The study report and EIS concluded that all 138 miles of the rivers (Green and Yampa) studied are eligible for wild and scenic designation. No designation, however, is being recommended until completion of quantification and litigation of federal reserved water rights for Dinosaur National Monument; completion of the wilderness study of the Cross Mountain area; development and evaluation of a water diversion proposal to meet Stage III of Cheyenne, Wyoming's water project; and evaluation of needs of water for energy development. Although they are included on the Nationwide Rivers Inventory, no study report and EIS have been completed for Range Creek or the portion of the Green River potentially affected by development of the Sunnyside STSA.

Pump houses, access roads, and other water development facilities could jeopardize potential for wild and scenic river designation along portions of the Green River between Desolation Canyon and the town of Green River, Utah. At best, portions of the Green River would not be classified as "wild," but could be classified as "scenic" or "recreational" under the Wild and Scenic Rivers Act. Pump houses and access roads could also severely diminish the quality of river running due to the incompatability of these man-made structures along stretches of the Green River.

Deterioration of water quality and an increase in water temperature resulting from surface mining on Mono's proposed conversion area could significantly reduce trout fishing opportunities on Range Creek. Visual disturbances along the upper reaches of Range Creek could also diminish the quality of the recreation experience. In addition, the altering of natural characteristics of the upper reaches of Range Creek and its immediate environment could preclude the stream from future designation as a wild and scenic river.

WILDERNESS RECREATION

Wilderness-related recreation opportunities in Desolation Canyon, Turtle Canyon, and Jack Canyon wilderness study areas (WSAs) east and south of the

main block include backpacking, camping, and horseback use (see Section 3.A.12, Wilderness Resources). These areas are popular for their terrain, color, wildlife, vegetation, and floatboating. The proposed actions would diminish the quality of hiking and primitive backpacking experiences in these units, especially in the areas adjoining the STSA, where sights and sounds of surface mining would be obvious to wilderness recreation users. In portions of these WSAs, the perception of solitude and natural experiences (primitive and unconfined recreational opportunities) by wilderness users would be compromised to a certain degreee by nearby surface mining and other project-related activities.

The Hill Creek Extension of the Uintah and Ouray Indian Reservation (8 miles east of the STSA and east of the Green River) is managed to preserve its natural characteristics and provides pristine recreation experiences. Secondary effects may occur in the Hill Creek Extension, slightly increasing recreation use due to the displacement of certain recreation users and opportunities (for example, hunting). Population increases resulting from the proposed tar sand development could lower the quality of primitive recreation experiences.

3.A.6 Visual Resources

IMPACT SIGNIFICANT CRITERIA

Impacts are considered significant for visual resources if changes in landform and vegetation or the addition of a structure would not meet the standards of the BLM Visual Resource Management (VRM) class for the area where the project would be located.

Impacts are considered to be highly significant if they could be viewed from the valleys to the west and south of the impact area and if the changes would not meet the standards of the VRM class for the areas in which they would be located.

SETTING

The proposed actions and alternatives would occur within the Colorado Plateaus physiographic province, which contains characteristic sets of landscape features, including landform and vegetation (Fenneman 1931). These features are used as a basis to determine existing visual values and to determine how changes brought about by the proposed actions and alternatives would affect these visual values.

The physical characteristics (topography and vegetation types) of the main block, Mono's mill site (southeast of Sunnyside), and the plantsites and spent sand disposal areas to the west of the main block are summarized in Section 3.A.3, Soils and Vegetation. Existing modifications to the natural landscape in the main block are generally limited to a few roads, a communication site, an airstrip, and some mineral exploration and mining. Modifications found in the area west of the main block include primitive roads and trails, rural and community development around Sunnyside and East Carbon City, a railroad, mining, and industry. The western escarpments and higher portions of the STSA are highly visible from U.S. Highway 6, State Highway 10, and local roads, as well as from such communities as Price, Wellington, Sunnyside, and East Carbon. The landforms provide a background to local foreground and middleground views from the valley highways and communities. The local views are not nearly as dramatic as the background itself, which places added quality on the views.

IMPACTS

The areas in which the proposed actions and alternatives, including the possible plantsites, spent sand disposal areas, and associated facilities, would be located were evaluated for visual resources using the BLM VRM system (BLM 1978). This system provides a standardized method for identifying and classifying visual resources.

The analysis of impacts is based upon the BLM Contrast Rating System, which determines a project's landscape contrasts by evaluating its visual contrast with the existing landscape by form, line, color, and textural changes. The extent of contrast is then translated into either adverse or beneficial impacts. See Appendix A-9, Visual Resource Management Methodology, for a definition of terms and further explanation of the system and how it was applied to this project.

The established VRM classes for the affected area (Map 3-5, map pocket of draft EIS) relate to the physical characteristics of the physiographic province previously described. Maps showing locations of scenic quality, visual sensitivity, and viewing

distances for any specific site can be found at the BLM Price River Resource Area Office. The landscape in four of the five VRM classes would be affected by the proposed actions. Table 3-15 summarizes existing and significantly affected acres for each class.

VRM Class II areas account for the southwest half and the central portion of the main block and the proposed Mono mill site and spent sand disposal area (east of Sunnyside). These areas generally correspond to the most visually sensitive portions of the main block. VRM Classes III and IV account for the classification of the remaining portions of the main block. The other applicants' processing plants and spent sand disposal areas would be located within VRM Class IV areas to the west of the main block. These class areas are most generally unseen by the public, or the landscape features are less diverse. Small segments of VRM Class V areas (less than 1 percent of the area) are rarely found within the affected area (BLM 1977). These VRM class designations are unique within the VRM system and should not be confused with air quality classifications, as no correlation exists.

Collectively, the proposed actions would significantly affect 18,932 acres of VRM Class II areas. Cumulatively, the proposed actions and interrelated projects would significantly affect 20,332 acres. Collectively, the proposed actions would significantly affect 7,268 acres of VRM Class III areas and 4,050 acres of VRM Class IV areas. Cumulatively, the total would be 7,268 acres of VRM Class III and 5,250 acres of VRM Class IV. The impacts would be undetermined for 2,445 acres collectively and 2,745 acres cumulatively. (These are the acreages that would be required for ancillary facilities whose specific locations are still unknown and were not analyzed for impacts.)

All impacts were considered to be long-term (beyond the life of the projects) because of the long period of commercial operations and length of time needed to lessen the visual contrast with the existing landscape. Short-term impacts (less than the life of the projects), such as the visual presence of work crews, were not considered.

SUMMARY

The highly significant visual impacts of the proposed actions would include a severely changed skyline of the main block, which serves as a backdrop to the views from the valley communities and highways to the west and south. Closer to the sites of the proposed actions, the introduced landform of the spent sand disposal areas would be visible, as would the introduced structures of the plantsites. Over time, revegetation would help lessen the impacts but would not overcome the contrasts between the present natural and the proposed highly modified landscape. Significant impacts caused by

TABLE 3-15
SUMMARY OF VISUAL RESOURCE EXISTING CONDITIONS AND SIGNIFICANT IMPACTS (Acres)
(Proposed Actions)

	VRM Class II[a]		VRM Class III[a]		VRM Class IV[a]		
Component	**Existing[b]**	**Significantly Affected[c]**	**Existing[b]**	**Significantly Affected[c]**	**Existing[b]**	**Significantly Affected[c]**	**Undetermined[d]**
Collective Projects							
Mines/In-Situ Development	16,168	16,168	975	975	3,950	3,950	-
Plants	1,139	1,139	3,528	3,528	1,600	100	-
Spent Sand Disposal Areas	1,625	1,625	3,515	2,765	1,000	0	-
Ancillary Facilities	-	-	-	-	-	-	2,445
Total Collective Impacts	18,932	18,932	8,018	7,268	6,550	4,050	2,445
Interrelated Impacts	1,400	1,400(H)	-	-	1,200	1,200	300
Total Cumulative Impacts	20,332	20,332	8,018	7,268	7,750	5,250	2,745

[a]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[b]Acres of existing VRM class in conversion areas included in the proposed actions.

[c]Acres that would be significantly affected under this alternative.

[d]This column indicates the acreages that would be required for ancillary facilities, where specific locations and impacts are unknown at this time. Refer to Appendix A-9, Visual Resource Management Methodology for a further explanation.

(H) = indicates if the impacts are highly significant (can be viewed from the valley to west and south).

long-term landform, vegetation, and structure additions would be viewed from within the project areas and viewing points surrounding the main block to the north and east. All areas in which significant impacts would occur would be reclassified to VRM Class V because rehabilitation would be needed to restore the landscape to the condition of the surrounding area. Because it would be virtually impossible to restore the extremely modified landform to its present condition, the view from the valley areas would be severely altered forever.

3.A.7 Air Quality

The information discussed in this section is summarized from the Air Quality Analysis for the Combined Hydrocarbon EIS, Eastern and South-Central Utah-Sunnyside STSA (Aerocomp Inc. 1983). Copies of this report may be obtained from

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

or

Public Room
Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, Utah 84111

IMPACT SIGNIFICANCE CRITERIA

The significance of predicted impacts is based on the provisions of the Clean Air Act (Public Law 95.95), which established the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) provisions.

The NAAQS are uniform minimum national standards for air quality, whereas the PSD provisions give air quality and related values more protection where existing air quality is better than the minimum required.

The states of Utah and Colorado have ambient air quality standards equal to the NAAQS, as shown in Table 3-16.

The primary standards are intended to protect public health, allowing for an adequate margin of safety. The secondary standards are intended to protect the public welfare from known or anticipated adverse impacts. Public welfare includes effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, climate, damage

TABLE 3-16
UTAH, COLORADO, AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Primary	Secondary
Oxidant (ozone)	1-hour[a]	235 $\mu g/m^3$	[b]
Carbon Monoxide	8-hour	10,000 $\mu g/m^3$	[b]
	1-hour	40,000 $\mu g/m^3$	
Nitrogen Dioxide	Annual [c]	100 $\mu g/m^3$	[b]
Sulfur Dioxide	Annual [c]	80 $\mu g/m^3$	-
	24-hour	365 $\mu g/m^3$	-
	3-hour	-	1,300 $\mu g/m^3$
Total Suspended Particulates	Annual[d]	75 $\mu g/m^3$	60 $\mu g/m^3$
	24-hour	260 $\mu g/m^3$	150 $\mu g/m^3$
Lead	Calendar Quarter	1.5 $\mu g/m^3$	[b]
Hydrocarbons[e]	3-hour (6-9 AM)	160 $\mu g/m^3$	[b]

Note: National standards, other than for ozone or those based on annual averages, are not to be exceeded more than once per year.
$\mu g/m^3$ = micrograms per cubic meter

[a]The number of days during a calendar year in which one or more hourly values could equal or exceed the ozone standard must be less than or equal to 1.

[b]Same as primary standard.

[c]Annual arithmetic mean

[d]Annual geometric mean

[e]Guideline for Oxidant Control, no longer a national standard.

to and deterioration of property, and hazards to transportation as well as effects on economic values and on personal comfort and well-being. Thus, comparing the impact to the secondary NAAQS is one way of assessing many air quality impacts.

Other than the standard for ozone or those based on annual averages, the standards are not to be exceeded more than once per year.

Utah and Colorado areas covered by the PSD provisions of the Clean Air Act are divided into two classes. Class I areas are those in which practically any air quality deterioration would be considered significant and near which little or no major energy or industrial activity would be allowed. Class II areas are those in which deterioration that normally accompanies moderate, well-controlled growth would not be considered significant. Different degrees of air quality degradation are deemed acceptable in the two classes. Class I and Class II degradation limits and the secondary NAAQS (being the most limiting) become the most relevant quantitative criteria to compare the pollutant concentrations resulting from tar sand development.

Colorado has adopted regulations for sulfur dioxide (SO_2) similar to the national PSD provisions. All federal Class I areas are included in the Colorado Category I classification, although not all Colorado

Category I areas are considered in the federal Class I provisions.

The Clean Air Act defines specific maximum allowable increases over baseline concentrations for only two pollutants—sulfur dioxide (SO_2) and total suspended particulates (TSP). Table 3-17 lists those allowable increments.

State and federal air quality program requirements are quantitative criteria for assessing the significance of the air quality impacts of tar sand development. This analysis, however, was conducted to satisfy the broader requirements of the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations and is not designed to satisfy the specific air quality permit processes of state and federal agencies. Therefore, the EIS analysis also considered impact criteria that are not necessarily quantitative. The Clean Air Act provides for a case-by-case determination of degradation of air quality related values (AQRVs) in mandatory Class I areas that are important to the specific Class I areas, whether or not the SO_2 or TSP increments would be exceeded. Air quality related values specifically include visibility but may also include plants, animals, soil, water, odor and cultural-archaeological and geologic resources.

No objective criteria exist for judging impacts on air quality related values other than the secondary NAAQS. This study discusses in detail only visibility impairment because it is the only air quality related value considered significant in the planned tar sand developments. Acid deposition and other issues are only briefly addressed.

Worst-case analyses, such as the one used in this air quality assessment, estimate high pollutant concentrations, because they use worst-case emission and meteorological assumptions. These analyses are performed to reveal potential problem areas and magnitudes. The location, production, and mining and plant processes assumed in this analysis are projections of possible resource development. The actual rate of resource development and the techniques to be used to extract tar sand are uncertain for most of the modeled sources.

In interpreting the results of a worst-case analysis, results must be considered with respect to air quality protection provided by law. The Clean Air Act requires strong state and federal regulatory programs to ensure that no major emitting facility will be built if it would cause or contribute to NAAQS violations. The PSD program also requires that, in areas where NAAQS are being met, no major emitting facility be

TABLE 3-17
PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS

		Maximum Allowable Concentrations ($\mu g/m^3$)		
Pollutant	**Averaging Time**	**Class I**	**Class II**	**Class III**
Sulfur Dioxide	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
Total Suspended Particulates	Annual	5	19	37
	24-hour	10	37	75

Note: $\mu g/m^3$ = micrograms per cubic meter.

built if the source will exceed Class II increments. If a proposed facility is shown to exceed Class I increments, the developer must convince the manager of the Class I area that AQRVs will not be adversely affected. The PSD process is an open process that includes substantial public involvement. Thus, the Clean Air Act guarantees that air quality will not deteriorate beyond standards (Dietrich 1983).

SETTING

The air quality analysis area (from Sunnyside, Utah to the Colorado-Utah border) is mainly rural, with light industry and thus the existing air quality is very good. Measured TSP matter, SO_2, and nitrogen dioxide (NO_2) concentrations at sites within or near the study area show that with the exception of TSP, ambient concentrations are well within the primary and secondary NAAQS. Carbon monoxide (CO) and ozone (O_3) are both below the primary NAAQS. Lead, which has not been monitored in the analysis area, is expected to be within the primary NAAQS due to the lack of major industrial sources of this pollutant and the relatively low number of vehicles in the region.

Measured results show that the region experiences TSP annual geometric mean concentrations as low as 15 to 20 micrograms per cubic meter (ug/m^3) to as high as 60 to 70 ug/m^3. Populated areas probably could approach the secondary NAAQS for the annual geometric mean. The measurements also show that the annual maximum 24-hour TSP concentrations range from 50 to 400 ug/m^3. These results show that isolated areas of the analysis area exceed the secondary NAAQS and possibly exceed the primary NAAQS for TSP.

Visibility in the area of influence is usually good, with seasonal average visual ranges from 87 to 142 miles. Geometric means of visual range at Dinosaur National Monument and Capital Reef and Canyonlands National Parks are 109, 113, and 118 miles respectively. The background visual range at Cedar Mountain has a mean value of 120 miles and ranges between about 62 and 217 miles. The good visibility reflects the presently low regional SO_2 concentrations and low relative humidities.

DIFFERENCES BETWEEN AIR QUALITY AND PROPOSED ACTIONS DESCRIPTION

The location and production level for the Chevron-GNC plant was changed after the preliminary draft EIS air quality modeling analysis was completed. The result was a difference in the following factors: (1) the number of applicant-proposed plantsites (five for the EIS versus four for the air quality analysis); (2) the production level for the proposed actions' collective analysis (115,000 barrels per day (bpd) for the EIS versus 105,000 bpd for the air quality analysis); (3) the production level for the proposed actions' cumulative analysis (125,000 bpd for the EIS versus 115,000 bpd for the air quality analysis); and (4) the location for the Chevron interrelated plant (new location for the EIS versus the old location of the air quality analysis).

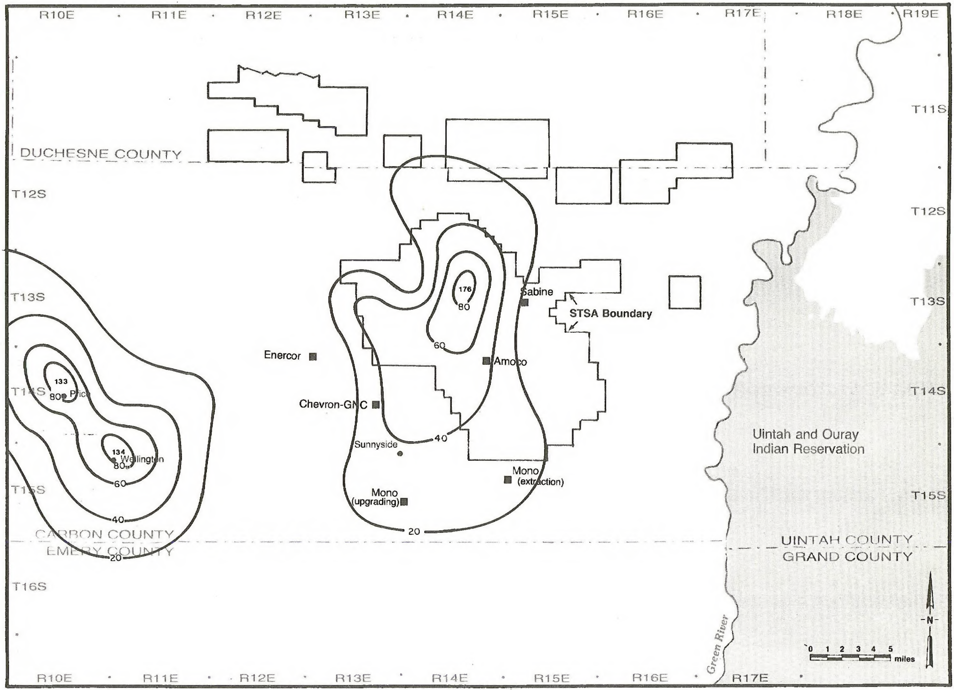
The differences were analyzed with respect to the predicted results. BLM and Aerocomp Inc. believe that the change in the impacts would not be significant because air quality impacts for the proposed actions mainly result from the Mono, Enercor, Amoco, and Sabine projects.

TOTAL SUSPENDED PARTICULATES

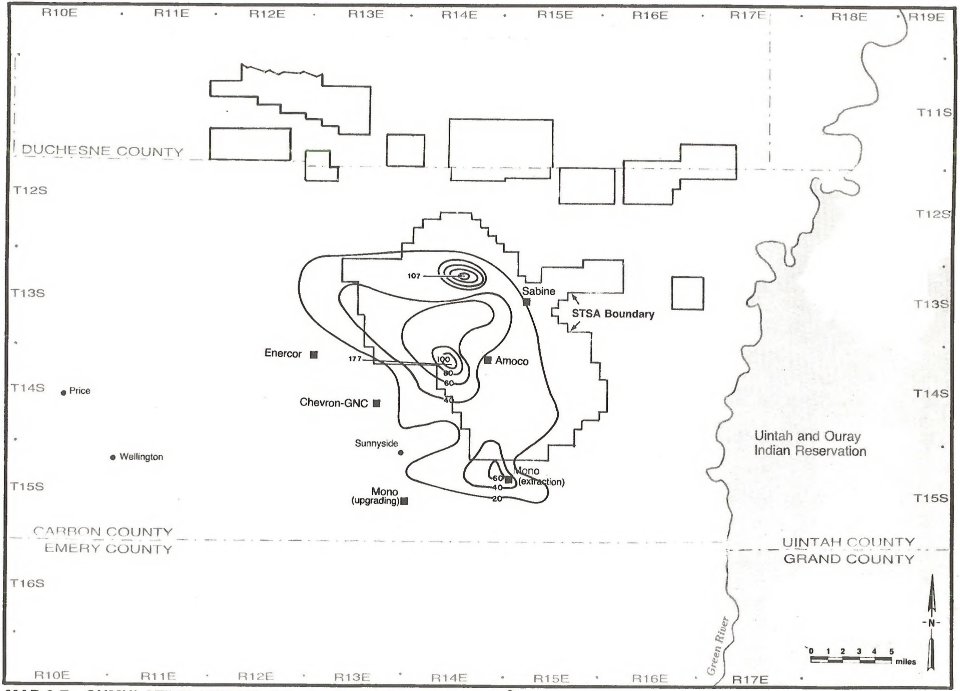
Table 3-18 lists the proposed actions' collective and cumulative concentration values at the receptors showing the highest concentration. These values are compared to the secondary NAAQS and year 2005 estimated background levels. The maximum receptor impacts are similar for collective and cumulative impacts due to the dominance of a few sources. Maps 3-6 and 3-7 show the expected annual average concentrations of TSP and NO_2, respectively, for the cumulative analysis. Slight increases in the overall concentrations above the collective totals can be seen, but the maximum receptor concentrations are essentially equal.

Map 3-6 does not include the estimated background concentrations of 20 ug/m^3. Therefore, the 40 ug/m^3 isopleth represents the area expected to exceed the TSP NAAQS (60 ug/m^3). An area encompassing both Price and Wellington is expected to exceed the annual standard as well as an area within the STSA.

The current emission inventory provided by the State of Utah shows that dirt roads are the dominant man-made emission source within Price and other cities and towns. If the emission inventories are correct, then dirt road emissions are the most significant source of the higher TSP levels. Naturally occurring blowing dust probably causes occasional high TSP levels but not the pervasive long-term high levels monitored in the towns.



MAP 3-6 CUMULATIVE ANNUAL TSP CONCENTRATIONS (ug/m^3)
(Proposed Actions)



MAP 3-7 CUMULATIVE ANNUAL NO_2 CONCENTRATIONS (ug/m^3)
(Proposed Actions)

TABLE 3-18
MAXIMUM SO_2, TSP, AND NO_2 CONCENTRATIONS
(Proposed Actions)

	Maximum Average Concentrations ($\mu g/m^3$)					
Areas of Special Concern	SO_2 3-hour	SO_2 24-hour	SO_2 Annual	TSP 24-hour	TSP Annual	NO_2 Annual
NAAQS	1,300	365	80	150	60	100
Class II Areas						
PSD Class II Increment	512	91	20	37	19	NA
Areas Near Sunnyside STSA						
Collective Impacts	612(18)	170(7)	15(1)	723(84)	181(24)	128(2)
Cumulative Impacts	612(18)	170(7)	18(1)	723(84)	181(24)	177(2)
Uintah and Ouray Indian Reservation						
Collective Impacts	12(18)	3(7)	<1(1)	<1(84)	<1(24)	2(2)
Cumulative Impacts	14(18)	4(7)	<1(1)	<1(84)	<1(24)	2(2)

Note: Selection of a different grid origin could result in slightly different maximum concentrations and locations of those maximum due to the terrain variability.

Figures in parentheses represent 2005 Baseline Source Concentrations.

NA = not applicable; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; TSP = total suspended particulates; $\mu g/m^3$ = micrograms per cubic meter

Outside cities and towns, the applicants' proposed tar sand developments would significantly affect TSP levels. Some surface mines are estimated to potentially emit more particulate matter than the entire city of Price, and TSP levels near those mines are predicted to exceed the standards. The Amoco surface mine and related activities would potentially emit five times more particulate matter than the city of Price and about the same as all sources in Carbon County for 1981. These large emissions within a relatively small area would lead to TSP values significantly above the standards.

Distributions of these high TSP levels in time and space would depend upon the specific mine, haul road, and access road geometry as the tar sand is removed during the life of the mine. High levels would probably remain within the STSA during most mining years.

NITROGEN DIOXIDE

The expected annual average NO_2 concentrations shown in Map 3-7 reveal that the NAAQS for NO_2 could be exceeded at two receptor grid points. One receptor would be affected mainly by the Amoco plant stack gases, and the other would be affected by the Amoco mining. On-site data or refined modeling may show that the predicted levels are higher than what might actually occur.

NO_2 impacts would result from both ground-level emissions from mine equipment and from elevated releases from stacks. The stack gas NO_2 impacts would be highly localized and could prove to be overpredicted through local wind monitoring or tracer tests.

SULFUR DIOXIDE

SO_2 is expected to be well below the NAAQS, but the PSD Class II increments could be violated due to elevated emissions in complex terrain. The areas that are estimated to be above the SO_2 Class II increments are generally within 1.25 miles of the proposed plants. In each case, the winds would have to carry the plume toward the higher elevations under highly stable atmospheric conditions to produce impacts. No on-site data, however, exists to confirm this assumption. General drainage flow would tend

to carry the plumes away from the affected terrain. Refined modeling or on-site data may show the predicted SO_2 levels to be higher than they actually would be.

CARBON MONOXIDE

Modeled only for the cumulative impacts of the proposed actions and the interrelated projects, the CO impact potential was determined to be very low. The predicted 1- and 8-hour concentration values of 1,500 ug/m³ and 900 ug/m³ are below the 1- and 8-hour maximum standards of 40,000 ug/m³ and 10,000 ug/m³, respectively.

PHOTOCHEMICAL PRODUCTS

The photochemical reactions of emissions of reactive non-methane hydrocarbons and nitrogen oxides (NO_x) are a potential air quality concern because of the production of photochemical oxidants (mainly ozone). The impact of emissions from the proposed actions and interrelated projects was analyzed by means of Version II of the Reactive Plume Model (RPM-II). Two trajectories were selected in the analysis, one traveling east toward Colorado and the other traveling southeast toward Arches National Park. (See the Air Quality Analysis for the Utah Combined Hydrocarbon Leasing Regional EIS, Eastern and South-Central Utah-Sunnyside STSA (Aerocomp Inc. 1983) for methodology details.) As shown on Table 3-19, for all areas of interest, the impact from the Sunnyside STSA would not exceed the ozone standard of 0.12 parts per million (ppm) (235 ug/m³). The results are conservative (higher) because all Sunnyside emissions were treated as a single point source.

ACID DEPOSITION

No current Environmental Protection Agency (EPA)-recommended guideline or procedure exists for determining potential impacts of acid deposition to sensitive ecosystems. SO_2 and NO_x are widely accepted as the major precursors to acid deposition; therefore, the deposition fluxes of sulfur and nitrogen compounds, especially in PSD Class I areas, should be the parameters of concern.

Table 3-20 shows deposition velocities of NO_2, SO_2, and sulfate (SO_4) and presents the results for the cumulative analysis of acid deposition impacts, which are similar to the results of the collective analysis. The dry deposition velocities were obtained from Schmel (1980) and Garland (1976). The wet deposition velocities were estimated using precipitation statistics (SAI 1983). (See the Air Quality Analysis for the Utah Combined Hydrocarbon Regional EIS, Eastern and South-Central Utah-Sunnyside STSA (Aerocomp Inc. 1983) for methodology details.)

Table 3-21 presents the results of the acid deposition analysis for areas of interest. In a submitted testimony before the Colorado Air Quality Control Commission, the Environmental Defense Fund (Oppenheimer 1982) suggested that sulfur deposition rates below 0.5 grams per square meter per year (g/m²-yr) would not lead to acidification of sensitive lakes. Sulfur deposition values from monitoring sites in the mountain regions show the background sulfur deposition flux to be 0.28 g/m²-yr. Consequently, more sulfur deposition flux below 0.22 g/m²-yr would suggest that sensitive ecosystems may not be affected (Dietrich and others 1983). The results in Table 3-21 show that the acidic sulfur deposition impacts that would result from Sunnyside tar sand development might be insignificant. A similar "safe" threshold for nitrogen has not yet been established. Comparing modeled results with those of other studies (Dietrich and others 1983) suggests, however, that, except in the Uintah and Ouray Indian Reservation, nitrogen depositions in the analysis area would be at background values.

VISIBILITY

The judgment of adverse visibility impairment in Class I areas is subjective and determined on a case-by-case basis. This study adopted the widely used EPA levels 1 and 2 screening criteria.

Table 3-22 shows the level 1 screening results for the cumulative impacts of applicant and interrelated projects. The collective impacts of just the applicants' proposed tar sand developments, which can be seen in the Air Quality Analysis for the Utah Combined Hydrocarbon Regional EIS, Eastern and South-Central Utah-Sunnyside STSA (Aerocomp Inc. 1983)), would be similar. C1 and C2 fail (exceed EPA guidelines) for all observer points analyzed; plume discoloration is perceptible regardless of the viewing background (dark terrain or blue sky). The SO_2 emissions are not sufficient to perceptibly contribute to regional haze (C3 passes level 1 screening).

TABLE 3-19
MAXIMUM PHOTOCHEMICAL PRODUCTS CONCENTRATIONS
(Proposed Actions)

Areas of Special Concern	O_3 (ppm)	NO_x (ppm)	PAN (ppm)	Aerosol ($\mu g/m^3$)
Maximum Concentration	0.11	0.042	0.0078	1.4
Uintah and Ouray Indian Reservation	0.10	0.0064	0.0063	1.2
Arches National Park	0.10	0.0025	0.0056	1.4
Colorado Border	0.09	0.0025	0.0049	1.4

Note: Results based on Version II of the Reactive Plume Model.

NO_x = nitrogen oxides; O_3 = ozone; PAN = peroxy acyl nitrates; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

TABLE 3-20
WET AND DRY DEPOSITION VELOCITIES FOR SO_2, SO_4, and NO_x

Pollutants	Dry Deposition Velocity (cm/s)	Wet Deposition Velocity (cm/s)
Sulfur Dioxide	0.8	1
Sulfate	0.2	1
Nitrogen Dioxide	0.8	1

cm/s = centimeters per second; SO_2 = sulfur dioxide; SO_4 = sulfate.

TABLE 3-21
ACID DEPOSITION ESTIMATES AT VARIOUS AREAS OF INTEREST
(Proposed Actions)

	Cumulative[a] Annual Deposition Flux (g/m^2-yr)	
Areas of Interest	Sulfur	Nitrogen
Uintah and Ouray Indian Reservation	0.1	0.8
Dinosaur National Monument	0.002	0.02
Arches National Park	0.005	0.04
Canyonlands National Park	0.001	0.01
Capitol Reef National Park	0.0004	0.003

Note: Results based on Mesopuff modeling.

g/m^2-yr = grams per square meter per year

[a]Represents cumulative impacts of the applicants' proposed tar sand development plus the interrelated projects.

TABLE 3-22
LEVEL 1 VISIBILITY ANALYSIS
(Proposed Actions)

Observer Point Location	C1 Plume Contrast Against Sky	C2 Plume Contrast Against Dark Terrain	C3 Region Reduction Sky/ Terrain Contrast
Panorama Point Arches National Park	0.126	0.321	0.073
Cathedral Valley Overlook Capitol Reef National Park	0.106	0.231	0.073
Murray Point Overlook Canyonlands National Park	0.111	0.256	0.073
Moonshine Rapids Dinosaur National Monument	0.118	0.283	0.073
Buck Knoll Uintah and Ouray Indian Reservation	0.175	0.604	0.073
Peters Point Uintah and Ouray Indian Reservation	0.190	0.712	0.073
EPA Recommended Guidelines	0.100	0.100	0.100

Note: Results presented are the cumulative impacts of the applicants' proposed tar sand development plus the interrelated projects.

The level 2 visibility results are summarized in Table 3-23. As noted, visibility would not be perceptibly impaired in the three Class I areas and Dinosaur National Monument. At Peter's Point and Buck Knoll on the Uintah and Ouray Indian Reservation, the plume could be perceptible against the sky due to the NO_x emissions from the proposed developments. Although particulate emissions at Buck Knoll could contribute to perceptible contrast and visual range reductions, the estimates given in Table 3-23 are conservative (high). The analysis assumed that all emissions within the STSA, including those from ground level sources, were combined to form a single plume.

3.A.8 Transportation Networks

IMPACT SIGNIFICANCE CRITERIA

Impacts to transportation are considered significant if the roadway volume-to-capacity relationship on project-related roadways would result in the traffic operating level-of-service falling below a stable flow condition. On the basis of Utah Department of Transportation (UDOT) standards for low density population areas, a level-of-service B was used as the desired operation standard, and a level-of-service C was used for high-density population areas. Transportation impacts are also considered significant if the vehicle miles of travel (VMT) increase generated by the proposed actions would increase the number of vehicle traffic accidents. Impacts of the rail gross tonnage per year are considered significant if the tonnage increase would result in highway vehicle travel delays at crossings of more than 5 minutes per hour. The addition of project-generated railroad tonnage is considered significant if the tonnage would exceed the operating capacity of the Denver and Rio Grande Western (D&RGW) railroad spur between Mounds and Sunnyside, Utah.

ROADWAY SYSTEMS

Roadway Systems The vehicular traffic and roadways associated with the Sunnyside STSA are run

TABLE 3-23
LEVEL 2 VISIBILITY ANALYSIS
(Proposed Actions)

Observer Point Location	Contrast Reduction	Visual Range Reduction	Blue-Red Ratio
Panorama Point Arches National Park	0.039	3.8	0.98
Cathedral Valley Overlook Capitol Reef National Park	0.041	4.0	0.98
Murray Point Overlook Canyonlands National Park	0.044	4.3	0.94
Moonshine Rapids Dinosaur National Monument	0.032	3.0	0.93
Buck Knoll Uintah and Ouray Indian Reservation	0.097	10.6	0.70
Peters Point Uintah and Ouray Indian Reservation	0.041	3.9	0.69
EPA Recommended Guidelines	0.100	11.0	0.90

Note: Results presented are the cumulative impacts of the applicants' proposed tar sand development plus the interrelated projects. The recommended criteria has to be exceeded for impacts to contrast and visual range reduction. Visual impacts occur for blue/red less than 0.9.

mainly within Carbon, Emery, and Duchesne counties, Utah (Map 1-3, Section 1.A.5). The major transportation arteries that serve the STSA are U.S. (US) Highway 6, State Road (SR) 10, SR 123, and Carbon County 381. US 6 is a two- and four-lane, paved highway that connects with Interstate 70 (I-70) 4 miles west of the town of Green River and runs northwest through Wellington, Price, Helper, and Salt Lake City. SR 10 is a two-lane paved road that runs southwest from Price and serves the towns of Huntington, Cleveland, Elmo, Orangeville, and Castle Dale.

PRIMARY ROADS PROVIDING ACCESS TO THE STSA

Geographic constraints limit vehicular traffic to entering the STSA in two ways—from the southwest corner through Sunnyside and from the north side through Nine Mile Canyon. The area within and adjoining the STSA has rough terrain, and the Green River forms a natural barrier along the STSA's east side.

The UDOT is responsible for monitoring the weight of loads carried on Utah state highways and issues special permits for vehicle loads exceeding state size and weight limits. The heaviest load that can be carried on Utah highways is a function of the number and spacing of vehicle axles and the nature of the load being carried. Vehicle weights exceeding allowable Utah limits require individual review by the UDOT to determine the structural capacity of the bridges and culverts to handle the loads.

SECONDARY ROADS PROVIDING ACCESS WITHIN THE STSA

SR 123 and Carbon County 381 serve as major collectors off US 6 to handle the traffic in and out of the STSA. SR 123, a two-lane paved road, leaves US 6, 7 miles east of Wellington and goes to Sunnyside, where it continues as 6522, an unpaved Carbon County road. This road connects with a variety of packed soil and gravel roads within the main block that are administered and maintained by BLM,

Carbon County, and private landowners. Carbon County 381, a paved road for only 12 miles, leaves US 6 at Wellington, loops to the west and the north side of the STSA, and intersects three unpaved BLM roads (6514, 6519, and 6559) to provide direct access to the north side of the STSA through Nine Mile Canyon. These roads also allow STSA traffic to flow south to Sunnyside.

The existing road system on public lands within the STSA is administered under a December 1980 Memorandum of Understanding between BLM and Carbon County. In this memorandum, BLM and Carbon County agreed to build and maintain roads to meet multiple-use responsibilities and build and maintain county road access to public lands in Carbon County. Private roads within the STSA are maintained and controlled by the private sector. Private ownership limits access to many miles of road and locations throughout the STSA. Applicant leases could prevent public access to public lands and ranches due to the cost of rebuilding new access roads outside the lease area. Map 3-5 (map pocket of draft EIS) shows the STSA road system.

STSA roads range in width from 8 to 20 feet and have surfaces ranging from packed soil to gravel. Road use is limited to pickups, vehicles with high clearance, or four-wheel-drives. The roads have been developed for mineral development, recreation vehicles, and livestock grazing. Vehicle accessibility is restricted in the STSA's upper elevations from November to May because of heavy snowfall.

TRAFFIC FLOW ANALYSIS

The capacity of a roadway system is a measure of its ability to accommodate traffic and is a function of physics and geometric characteristics, such as number of lanes, lane width, grade, auto-truck vehicle mix, and operating speeds. The peak years of collective and cumulative construction and operation were selected for evaluating impacts. Capacity analysis was completed for annual average monthly traffic (AAMT).

IMPACTS

According to the UDOT, the 1982 existing traffic and the road facilities serving the project area are generally in a stable flow condition. The project traffic associated with the proposed actions would cause a downgrading of the level-of-service on most of the road segments within the project area.

Under the maximum peak demand conditions for the projected peak years of 1989 and 2003, collectively, 8 of the 16 road segments of the project area would be operating below the level-of-service; cumulatively, 12 of the 16 road segments would be operating below level-of-service C. This projection is based on service values for level-of-service C and computed from standards from the American Association of State Highways and Transportation Officials and used by the UDOT as a design standard for rural minor arterial and major collectors.

Table 3-24 shows the projected baseline estimates, vehicle trips per day (VTPD), total peak demand, percentage increase over the projected baseline, and level-of-service for the collective and cumulative peak construction operation overlap years and the operation years. Table 3-24 also includes 16 specific roadway segments on US 6 between Green River and Helper, on SR 123 between the US 6 junction and Sunnyside, and on SR 10 between Price and Castle Dale and identifies segments that would be affected.

During the peak year of 1989, the proposed actions would collectively increase VTPD by 10,250 for the construction-operation overlap year. This increase would cause a short-term impact by lowering the level-of-service below C between 1988 and 1991 on specific roadway segments within the conversion area. The peak year 2003 would add 10,460 VTPD to the proposed actions' operation period and would lower UDOT's level-of-service C, a preferred maximum traffic volume for rural arterial and collector roadways. Table 3-24 lists specific segments (seven in 1989 and eight in 2003) where the level-of-service would fall below C and that would have significant traffic volume impacts. These segments are shown on Map 1-3 (Section 1.A.5).

During the peak years of 1989 and 2003 the proposed actions and interrelated projects would cumulatively add 19,746 VTPD to the roadway system during the construction-operation overlap period and 20,072 VTPD during the operation period. Impacts would occur on US 6, SR 10, and SR 123 and extend to other roadway segments on SR 10 between Price and Castle Dale. Table 3-24 shows segments (10 in 1989 and 13 in 2003) that would have significant long-term impacts. The impacts are directly related to lowering the level-of-service below C.

TABLE 3-24
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Proposed Actions)

			COLLECTIVE IMPACTS										
			Construction-Operation Overlap Impacts						Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	Level-of-Service for Project & Projected Baseline	2003 Level-of-Service Baseline[c]	Projected 2003 Baseline Estimate (VTPD)[a]	2003 Applicant Related increase (VTPD)	Total Peak VTPD	Percent Increase Projected Baseline	Level-of-Service for Project & Projected Baseline
US 6													
Junction SR 139	1	C	12,653	820	13,473	8	C	C	14,890	940	15,630	6	C
FAS 298 (old road) SR 55 West of Price	2	B	8,164	1,620	9,784	19	C	B	9,478	1,500	10,978	18	C
Bypass Road S of Price	3	B	9,421	8,315	15,736	67	C	B	10,936	5,565	18,501	50	C
West incl. Wellington	4	B	6,876	6,315	13,191	91	E	C	7,982	5,565	13,547	70	E
East Incl. Wellington	5	B	4,683	7,360	12,033	157	E	B	5,437	7,575	13,012	139	E
Woodside-FAI 70 West of Green River	6	B	2,545	330	2,875	12	B	B	2,994	180	3,174	8	B
SR 123													
Junction US 6	7	B	2,718	7,680	10,398	283	E	B	3,155	7,755	10,910	248	E
Junction SR 124	8	C	4,034	9,580	13,614	237	F	C	4,383	9,890	14,273	226	F
South incl. Sunnyside-North Incl. Sunnyside	9	B	2,015	10,250	12,285	509	E	B	2,338	10,460	12,796	447	E
SR 10													
East Incl. Castle Dale	10	C	3,439	300	3,739	9	C	C	3,993	270	4,263	7	C
Junction SR 29	11	D	5,305	300	5,605	5	C	D	8,159	270	6,429	4	D
South Incl. Huntington	12	D	6,860	525	7,385	7	D	D	7,894	450	6,344	6	E
Junction SR 155 Road to Elmo	13	C	3,883	795	4,678	20	C	C	4,608	875	5,183	17	C
Carbon/Emery County Line	14	C	3,883	810	4,693	21	C	C	4,508	680	5,188	15	C
Junction SR 122	15	C	4,034	835	4,868	21	C	C	4,684	695	5,879	15	C
Price South Incl. Price	18	D	5,712	850	7,562	13	D	D	7,759	720	6,469	9	E
US 6													
Junction SR 139	1	C	12,653	1,725	14,378	13	C	C	14,690	1,720	16,410	12	C
FAS 298 (old road) SR 55 West of Price	2	B	8,164	3,620	11,784	44	C	B	9,478	3,750	13,228	40	C
Bypass Road S of Price	3	B	9,421	14,035	23,456	148	C	B	10,938	9,860	20,796	90	C
West Incl. Wellington	4	B	6,876	9,570	16,448	139	E	C	7,982	9,010	18,992	113	E
East Incl. Wellington	5	B	4,683	8,410	13,093	180	E	B	5,437	9,480	14,917	174	E
Woodside-FAI 70 West of Green River	6	B	2,545	385	2,930	15	B	B	2,994	225	3,219	8	B
SR 123													
Junction US 6	7	B	2,718	8,640	11,358	318	E	B	3,155	8,570	11,925	278	E
Junction SR 124	8	C	4,034	9,840	13,874	244	F	C	4,383	10,100	14,483	230	F
South Incl. Sunnyside-North Incl. Sunnyside	9	B	2,015	10,500	12,515	521	E	B	2,338	10,460	12,798	447	E

TABLE 3-24 (Concluded)
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Proposed Actions)

	CUMULATIVE IMPACTS													
			Construction-Operation Overlap Impacts							Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	2003 Level-of-Service Projected Baseline[c]	Projected Level-of-Service Baseline[c]	2003 Baseline Estimate (VTPD)[a]	2003 Applicant Related Increase (VTPD)	Total Peak VTPD	Percent Increase Projected Baseline	Level-of-Service Projected Baseline[c]
SR 10													
East Incl. Castle Dale	10	C	3,439	990	4,429	29	C	C	3,993	1,100	6,093	28	C
Junction SR 29	11	D	5,305	990	8,295	19	C	D	6,159	1,100	7,259	18	D
South Incl. Huntington	12	D	6,860	1,435	8,295	21	D	D	7,894	1,560	9,454	20	E
Junction SR 155 Road to Elmo	13	C	3,883	2,030	5,913	52	C	C	4,508	2,200	6,708	49	C
Carbon/Emery County Line	14	C	3,883	2,055	5,938	53	C	C	4,508	2,240	8,748	50	C
Junction SR 122	15	C	4.034	2,090	8,124	52	C	C	4,684	2,285	8,969	49	C
Price South Incl. Price	16	D	6,712	2,120	8,332	33	D	D	7,759	2,325	10,084	30	E

Note: VTPD = vehicle trips per day; Incl. = including.

[a]Refers to locations shown on Map 1-3.

[b]Projected 1981 highway traffic volume for US 6, SR 123 and SR 10 by one percent compounded.

[c]American Association State Highway and Transportation (1965) Levels-of-Service. A=free traffic flow, accompanied by low volumes and high speeds; B=stable traffic flow, with operating speeds beginning to be restricted by traffic conditions; C=stable traffic flow, but drivers are restricted in their freedom to select speed, change lanes, or pass; D=approaches unstable traffic flow, with fluctuations in volume and temporary restrictions to flow, which may cause substantial drops in operating speeds; E=unstable traffic flow, with momentary stoppages; F=forced traffic flow, with low speeds and short or long stoppages because of downstream congestion. Level-of-Service = Baseline x factor (Volume Per Hour) - factor (Volume Capacity Ratio and calculated on a highway speed of 60 mph under uninterrupted flow conditions).

The vehicle accident rate on US 6 between Soldier Summit and Green River for 1982 was 1.22 accidents per million vehicle miles traveled (MVMT), which is below the State of Utah's expected rate of 2.06 accidents per MVMT for roads similar to US 6. On SR 123 between the US 6 junction and Sunnyside, the rate for 1982 was 0.75 accidents per MVMT, which is also below the expected rate of 2.88 accidents per MVMT. On SR 10, between Price and Castle Dale, the 1982 accident rate was 1.29 accidents per MVMT, which is below the expected rate of 2.02. The traffic accidents per MVMT in 1982 on US 6 between Soldier Summit and Green River was 166; on SR 123 between the US 6 junction and Sunnyside the accident rate per MVMT was 6; and on SR 10 between Price and Castle Dale the accident rate per MVMT was 64.

In 1989, the construction-operation overlap year, collective operations would add 10,250 VTPD to US 6, SR 10, and SR 123; in 2003 the collective operations would add 10,460 VTPD. Increased traffic volume would cause the level-of-service for some segments of the road system to fall below C as shown in Table 3-24. More traffic accidents are expected to occur on these segments.

UDOT Division of Traffic Safety data shows that traffic accident rates would not significantly increase but that traffic accidents would increase in proportion to the increase in traffic volume. Collectively, in 1989 (the construction-operation overlap year) the 195 percent increase in VTPD would cause 156 more traffic accidents, and in 2003 (the operation year) a 201 percent increased in VTPD would cause 161 more traffic accidents. This increase in traffic accidents would be a significant long-term adverse impact to traveler safety.

In the peak years 1989 and 2003 the proposed actions and interrelated projects would cumulatively increase traffic volume by 19,746 and 20,072 VTPD, respectively. The additional traffic would lower the level-of-service below C for specific segments of the road system (Table 3-24). SR 10 between Price and Castle Dale would be most affected by the in-

creased traffic volume. UDOT reported that the traffic accident rate would not significantly increase, but the traffic accidents would increase in proportion to the increased traffic volume. Cumulatively the proposed actions and interrelated projects in 1989 would increase VTPD by 469 percent, causing 375 more traffic accidents, and in 2003 (the operation period) increase VTPD by 478 percent, causing 382 more traffic accidents. This increase of traffic accidents would significantly impair traveler safety.

RAILROAD SYSTEM

The Denver and Rio Grande Western (D&RGW) Railroad, a class I railroad, serves the area of influence with a spur leaving the mainline at Mounds and ending at Sunnyside. The Carbon County Railroad, a class II railroad, uses the D&RGW spur to Sunnyside and its own track south of Sunnyside to the Kaiser Coal Mine. The Sunnyside spur and the Carbon County Railroad are mainly used by unit coal trains. The D&RGW mainline connects Salt Lake City with Denver and runs 25 to 30 trains per day, 25 percent of the line's capacity of 100 to 125 trains per day. The 17.5-mile spur from Mounds to Sunnyside carries 3.6 million gross tons per year and has a carrying capacity of 5 million gross tons per year. Because of the closure of the US Steel Coal Mine and the decrease in Kaiser Coal Mine production, future tonnage on the spur would drop well below 2.1 million gross tons per year. The only siding at Sunnyside is owned by US Steel.

Collectively, the material and equipment needed to build the five processing plants proposed by the applicants could exceed 3 million gross tons for the peak construction year, 1989. Adding 3 million gross tons could cause a significant short-term impact to the D&RGW spur by exceeding the line's 5-million-gross-tons-per-year capacity. The processing plants would be built from modules hauled by rail to the Sunnyside area and trucked to the plantsites. These modules could generate oversize loads that would need special handling by the D&RGW. But the impact of these oversize loads could be insignificant.

Collectively, the five proposed processing plants would produce 115,000 bpd of synfuel during full commercial operation. According to applicant plans of operations, the synfuel could be carried from the plants by truck, rail, pipeline, or a combination of the three. Hauling large volumes of synfuel by truck is considered impractical. For example, to haul 57,500 bpd (half of the proposed production) would require 302 trucks per day (one-way) carrying 8,000 gallons per load, each weighting 30 tons. Thus, the analysis assumed that during commercial operation, synfuel would be carried by rail and later by pipeline.

Estimating the worst case, the analysis assumed that half of the proposed 115,000 bpd, or 57,500 bpd would be shipped by rail from Sunnyside. This volume of synfuel amounts to 3.3 million gross tons per year. When these tons are added to the estimated 2.11 million gross tons per year of baseline capacity, this total volume would slightly exceed the 5 million gross ton capacity of the D&RGW spur. Carrying 57,500 bpd could require loading 105, 85-ton railroad tank cars in a 24-hour period and would involve 2.4 unit trains (84 cars/train) or 205 cars per day in and out of the East Carbon-Sunnyside area. This load would have a significant long-term tonnage capacity impact to the rail spur.

Another significant long-term land use impact could result from using land next to the D&RGW spur in the East Carbon-Sunnyside area to build speed-loading facilities and a rail car storage yard for 210 tank cars. This land use would affect transportation by increasing rail crossings. In addition, such facilities would degrade visual resources.

As production approaches the full commercial level of 115,000 bpd, shipping the synfuel by pipeline, as suggested by the applicants, could become more economical. The proposed actions and interrelated projects would have a significant cumulative long-term impact on the Sunnyside D&RGW spur during the operation peak year of 1995. The total rail tonnage for the coal mines is estimated to be 7.2 million gross tons per year by 1990, which alone would exceed the existing capacity of the rail spur. Cumulative tonnage also would add to the congestion of the rail storage yard in the East Carbon-Sunnyside area. The potential final impact would be delayed coal shipments and the resultant loss of money.

PUBLIC TRANSPORTATION SYSTEMS

Two public airports serve the area of influence. The Carbon County Municipal Airport lies 4 miles from Price and has three paved runways of the following lengths: 3,640, 4,520, and 5,700 feet (being expanded to a 7,300 feet). The airport at Green River, which is relocating, will have a 5,000-foot-long paved runway.

Neither airport has commercial flights, but both provide charter service. The airports are operated only during the day.

The increased demand for service from predicted project-related population increases could have a significant, long-term benefit on transportation. Projected population increases in 1989 (46,400) and in 2005 (63,200) could increase demand enough to support establishing commercial flights to the local airports.

Passenger rail service is provided by Amtrack. Two trains per day (one east and one west) stop at Helper. Bus service is provided by Trailways. Three buses per day travel US 6 and stop at Green River, Wellington, Price and Helper, and go on to Salt Lake City. No buses serve East Carbon, Sunnyside, or SR 10 to Castle Dale.

Collectively, population increases associated with the applicants' proposed projects would not significantly affect passenger rail or bus service. Cumulatively, population increases associated with the proposed actions and interrelated projects would not significantly affect passenger rail or bus service along Route US 6 but could provide the impetus to establish service on SR 10 to the towns of Huntington, Cleveland, Elmo, Orangeville, and Castle Dale and on SR 123 to East Carbon and Sunnyside.

SUMMARY

Significant transportation impacts (lowering the level-of-service below C) would be generated collectively by applicant proposed projects during 1989 (the peak construction-operation overlap year) and during 2003 (the peak operating year). Both collective and cumulative significant impacts would occur on US 6 between the SR 123 junction and the town of Helper; on SR 123 between the US 6 junction and Sunnyside; and on SR 10 between Price and Castle Dale.

Increases in project-related rail tonnage would generate significant collective and cumulative impacts because the tonnage would exceed the 5 million gross ton capacity of the rail spur. The collective impacts would start in 1989, and the peak operation year would be 2003.

The cumulative impacts of exceeding the capacity of the D&GRW spur would start in 1989 and continue through the peak operation year (1995) for the lives of the coal mines and the 10,000 barrels per day (bpd) Chevron processing plant in the East Carbon-Sunnyside area. These collective and cumulative impacts, however, would be significant only for the D&RGW spur from Mounds to Sunnyside.

Increases in project-related traffic would significantly affect road maintenance, even though the level-of-service would not change. Because some loaded trucks could weigh from 90,000 to 200,000 pounds and range from 25 to 102 feet in length, new roads would be needed along the construction realignment, and all the roads used by the applicants within the STSA would need to be upgraded. The large and heavy trucks would mostly use the STSA roads, but if required to use the public roads, special use permits would have to be obtained from UDOT. Road building and upgrading for the proposed actions would significantly degrade visual resources during both construction and operation periods. These impacts would begin in 1986, 2 years before the plantsites are built because roads must be built before plant construction.

3.A.9 Agriculture

IMPACT SIGNIFICANCE CRITERIA

The grazing and cropland impact significance criteria are based on professional experience from various agricultural areas and on the total acreage and type of cropland within the proposed conversion and surrounding areas.

Impacts to livestock grazing would be considered significant if the amount of forage lost would reduce livestock stocking rates by 5 percent or more in affected pastures or allotments. Impacts to an allotment would be considered significant when more than 10 percent of forage would be lost to grazing within the allotment.

Impacts to cropland would be considered significant if (1) more than 5 acres of land within the project area would be irreversibly converted to other uses, (2) the productivity of any of the land would be diminished by a project, or (3) more than 5 percent of the total cropland outside a conversion area would be irreversibly converted to other uses because of project development.

LIVESTOCK GRAZING

Livestock grazing and carrying capacity information presented in this EIS was gathered from interpretations of a third-order soil survey (Soil Conservation Service (SCS) and BLM 1981), the Price River Grazing Management Draft EIS (BLM 1982a), and the Range Creek Management Framework Plan (BLM 1982b). Livestock grazing is authorized on state and federal lands where the proposed conversions are located. BLM has established grazing allotments that are legal parcels of land for which grazing privileges are authorized. These allotments also include lands administered by the State of Utah and privately owned lands. Allotment boundaries were determined by the location of permittees, private lands, qualified demand, and customary area of use. Twenty-four ranchers are allowed to graze livestock on 12 allotments within the area of influence (Map 3-2, map pocket of draft EIS). Grazing allotments that would be affected by the proposed actions and alternatives are listed in Table 3-25. Most of the operations are cow-calf or cow-calf-yearling operations. None of the permittees now graze sheep on public lands within the area of concern.

Grazing capacities vary widely in the area due to vegetation types (range sites), landforms, slope, and range condition. Not all lands within the area are suitable for livestock grazing. Areas with slope over 50 percent are generally not suitable. Grazing capacities range from 9 to 61 acres per animal unit month (AUM). The lower capacity areas occur in the droughty lowlands and south-facing steep mountain slopes in the drier climatic zone; the higher capacity areas occur where the average annual precipitation is higher and in higher elevations on smoother slopes.

Forage production would be significantly affected by the land disturbance of mining the proposed conversion areas. Collectively, the proposed actions would cause a 387-AUM loss of forage per year. Cumulatively, the proposed actions and interrelated projects would cause the annual loss of 409 AUMs of forage.

This forage loss would result from the disturbance of surface mining, in-situ recovery, spent sand disposal, and land being occupied by buildings and roads (Map 3-2, map pocket in draft EIS). Table 3-25 shows the potential loss of AUMs by allotment, number of operators affected, and the number and percentage of each allotment affected. The proposed actions would affect 12 allotments and disturb grazing for 74 years.

Surface mining and spent sand disposal would disturb grazing the most. The total area would not be disturbed by surface mining or covered by spent sand in the early stages of the mining operation, but because of steep terrain, the spent sand placement process, and associated traffic, the mining sequence either would require excluding livestock grazing or would cause a loss of forage production for grazing for longer periods of time (10 years or more). Disturbed land would be reclaimed at the same rate as mining progresses, except for Amoco's mine, where the pit would remain open for 20 years with 3,000 acres unreclaimed.) (See Figure 1-9 in Section 1.D.2, and Appendix A-7, Reclamation and Erosion Control Programs, for more details.) No more than 6,500 acres at any one time would undergo surface mining and spent sand disposal or would be in various stages of reclamation and unable to support grazing.

Developing the proposed conversion areas would affect 24 ranch operators who own land and lease public land for grazing within the 12 allotments where surface mining, spent sand disposal areas, plantsites, and in-situ recovery would be located. Most of the grazing loss would be sustained by 12 ranch operators within seven allotments at various times during active mining. (See Table 3-25 for number of operators, allotments affected, and potential AUMs lost.) The AUM losses in Cow Canyon, Sheep Canyon, Dry Canyon, and Patmos grazing allotments would be significant. The percentage of AUMs lost to grazing in these allotments would vary from 9 to 12 percent of total acreage of the allotment for the lives of the proposed mines.

The degree of impact on each ranch operation would greatly vary due to location and size of individual holdings (owned and leased) in relation to the proposed development of lands. The size of the impact also would vary with the rate and timing of mine development. Thus, the extent of the impact cannot be quantified. No reduction in grazing preferences, however, is expected.

Reclamation and revegetation of disturbed land are expected to be successful and to allow forage production for grazing when mining is completed. This expectation for successful reclamation is based on three assumptions: (1) implementation of the erosion control and reclamation programs outlined by the applicants, (2) compliance with site-specific erosion control and reclamation plans approved by federal and state authorizing agencies and private landowners, and (3) compliance with requirements and stipulations of right-of-way grants and mineral leases for federal and state lands.

TABLE 3-25
GRAZING ALLOTMENTS AFFECTED AND GRAZING LOSSES CAUSED BY THE PROPOSED ACTIONS

	CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMs)[a]				
Allotment Name and Number	Number of Operators	Acreage Public	Acreage Total	Active Preference (AUMs)	Collective Total	Interrelated Projects Total	Cumulative Total	Percent of Allotment	Additional Notes
B Canyon (4006)	1	2,024	2,779	100 (20 Ac/AUM)	22 (3)	0 0	22 (3)	22 (3)	
Cow Canyon (4032)	4	2,145	—	71 (30 Ac/AUM)	54 (6)	0 0	54 (6)	78 (9)	
Dry Canyon (4038)	1	14,805	20,680	890 (17 Ac/AUM)	435 (114)	0 0	435 (113)	49 (13)	Significant impact to ona operator
Grean River North (4049)	1	122,845	166,621	8,584 (14 Ac/AUM)	502 (95)	0 0	502 (95)	8 (1)	
Mud Springs (4077)	1	21,836	27,859	2,320 (9 Ac/AUM)	108 (20)	0 0	108 (20)	10 (0.1)	
North Clarks Valley (4079)	1	8,240	14,981	293 (28 Ac/AUM)	11 (2)	0 0	11 (2)	4 (0.1)	
Pace Canyon (4085)	1	1,341	7,823	80 (17 Ac/AUM)	19 (2)	0 0	19 (2)	24 (3)	
Patmos (4087)	1	1,336	7,878	47 (28 Ac/AUM)	47 (6)	0 0	47 (8)	100 (12)	Significant impact to one operator
Ranga Creek (4098)	1	43,899	54,888	300 (43 Ac/AUM)	2 (2)	0 0	2 (2)	0.8 (0.8)	
Rock Canyon (4100)	1	978	2,664	18 (61 Ac/AUM)	4 (1)	0 0	4 (1)	25 (3)	
Sheep Canyon (4103)	7	9,170	18,302	696 (13 Ac/AUM)	531 (85)	0 0	531 (85)	78 (12)	
Stone Cabin (4109)	2	23,014	30,518	1,825 (14 Ac/AUM)	118 (26)	0 0	116 (26)	7 (2)	
Outsida[b]	2	unknown	NA	-- (18 Ac/AUM)	208 (25)	112 (22)	320 (47)	NA NA	
Total AUMs Lost/Yaar					(387)	(22)	(409)		

Note: AUM = animal unit month; Ac/AUM = acres per animal unit month; NA = not applicable.

[a]Figures without parentheses represent forage production (AUMs) per year for the entire proposed conversion area or area affected. Figures enclosed by parenthesis represent average forage production (AUMs) lost per year due to mining activities based on a 5-year reclamation schedule (with exception of Amoco).

[b]Grazing parcels outside of named allotment boundaries.

Sabine's proposed in-situ recovery process would disturb 6,000 acres of vegetation over a 30-year period, causing a short-term (2 to 5 years) loss of 1,000 acres at any one time.

The disturbance of building pipelines, power lines, and roads would cause a short-term insignificant loss of forage (2 to 5 years) on 845 acres along a narrow, elongated area.

An additional unknown number of AUMs would be lost by grazing areas becoming remote or inaccessible. This problem would arise through (1) disruption of livestock waters and facilities (2) disruption of grazing patterns and access to areas by surface mining, and (3) land disturbance by spent sand disposal areas. AUM loss cannot be quantified because specific details on the mining sequence and reclamation schedules are unknown.

In addition to direct loss of livestock forage, the following secondary grazing impacts would result from population and traffic increases and mine development: (1) disturbance of allotment boundary and pasture fences resulting in livestock grazing control problems, (2) molestation of grazing animals by off-road vehicle users, (3) increased vandalism of fences and other range facilities, (4) increased livestock road kills, and (5) reduced palatability of forage next to haul roads and other conveyance systems due to dust-covered vegetation.

CROPLAND

No cropland occurs within the main block, but 16,617 acres of cropland occupy the terraces and flood plains of the Price River and its larger tributaries and the gently sloping plains near Wellington, Price, and Sunnyside. This cropland lies within the area that would be affected by urban expansion and development. Low annual precipitation (6–12 inches) makes crop production in these areas entirely depend on irrigation. Thirty percent of this cropland consists of prime agricultural land, which occurs on the nearly level terrace and flood plains (SCS–BLM 1970; SCS 1979; State of Utah 1981).

The main type of farming is the growing of livestock feed. Alfalfa hay, the main crop, is grown on 70 percent of the cropland areas. Small grains, (barley and oats), corn, and pasture and meadow hay are other crops grown (SCS and BLM 1970; SCS 1979).

No cropland would be affected by spent sand disposal or by any of the plants on surface or in-situ resource recovery operations. Cropland losses, however, are expected due to population expansion and water diversion. Project-related population increases would cause the conversion of 2,826 acres of land to homesites and other related urban development in the areas of Price, Wellington, and Sunnyside (0.13 acres per capita, ERS 1970). Although most land use conversion would occur in existing subdivisions or on native rangeland, 933 acres of cropland, including prime agricultural land, would be converted to urban uses along the Price River between Price and Sunnyside Junction (mainly near Wellington).

The sale and diversion of water from agricultural use to tar sand development and the conversion of cropland to urban uses would significantly reduce Carbon County's cropland base.

3.A.10 Cultural Resources

IMPACT SIGNIFICANCE CRITERIA

Cultural resources would be significantly affected if adverse impacts are not mitigated by recording, excavation, or any other means and if the cultural resource is considered significant.

PREHISTORY

The Sunnyside STSA lies within the northern portion of the Colorado Plateaus physiographic province, which has been inhabited for 12,000 years. Within this time span, population patterns have fluctuated according to environmental and socioeconomic constraints. These population patterns have been assigned by prehistorians to several culture periods: Paleo-Indian, Archaic, Fremont-Anasazi, and Shoshonean (BLM 1980b).

Most archaeological research in the area has been in Nine Mile Canyon, north of the main block of the STSA. (Morss 1931, 1954; Reagan 1933; Gillin 1955; and Gunnerson 1957). A portion of Nine Mile Canyon has a high density of archaeological resources. The canyon contains a variety of site types, including rock art, dry masonry fortresses, pit houses, granaries, caves, and rockshelters. The district has

the greatest known concentration of rock art sites from the Fremont culture period in the area. Five sites have been excavated in Nine Mile Canyon. The sites yielded ceramics dating to the Fremont period; circular, rock-lined, semisubterranean dwellings; dry-laid masonry structures; and at least one burial (Gillin 1955).

Only a small portion of the main block has been surveyed in detail for cultural resources. The STSA was included in a Class II sample survey (Hauk 1977); 8 of 1,747 known cultural resource sites identified lie within the main block. The sites include lithic scatters, campsites, rock-lined and dry-masonry structures, and rock art (Hauk 1979). The Flat Canyon Archaeological District, near but to the east of the main block, is listed on the National Register of Historic Places and is included in the Desolation Canyon National Historic Landmark.

Nielson and others (1981) conducted a recent survey of the Kaiser Steel Sunnyside Mine lease next to the main block. This study concluded that most prehistoric sites are in primary canyon bottoms and sides, some are on high-altitude flats and benches, and only a few are on talus slopes and cliffs.

One known prehistoric site lies in the Amoco project area. This site consists of a large lithic scatter from the Archaic period but was probably used during the Fremont and Shoshonean periods as well (Amoco 1982). More prehistoric sites may be found within the main block as surveys are completed.

Both surface and sub-surface cultural resources could be destroyed or damaged by exploration, strip mining, in-situ recovery, plant construction, product transportation, off-site disposal, and other construction and operation activities. Such damage would result in a loss of scientific and cultural information and a loss of a portion of the resource base for future research. The loss of any information could significantly hinder efforts to reconstruct the prehistory and history of the region.

Should the conversion applications and plans of operations be approved, in accordance with pertinent historic preservation legislation and BLM policy, lease areas and other properties directly affected by the proposed actions would be subjected to 100 percent surveys of cultural resources before any surface disturbance. The surveys will be conducted in consultation with the Federal Agency Authorized Officer and the Utah State Historic Preservation Office.

A BLM archaeologist conducted a literature review to identify known sites that could be affected. The Nine Mile Canyon and the Flat Canyon Archaeological District would not be directly affected by the proposed actions but would face an increased risk of vandalism and inadvertent destruction from increased human activity in the main block. The prehistoric site in the Amoco project area would be destroyed, but some information from the site could be recovered as required by the Federal Agency Authorized Officer and the Utah State Historic Preservation Office. Should the proposed conversions and plans of operations be approved, this and other sites would be evaluated for significance, and adverse impacts would be mitigated to the extent possible and appropriate before actual surface disturbance. Cultural resources could be significantly impaired if adverse impacts are not mitigated by recording, excavation, or other means.

Interrelated projects would have the same types of impacts to prehistoric resources as would the proposed actions, but cumulative impacts would be greater because of the 2,900 more acres disturbed and the greater human influx.

HISTORY

The STSA's history followed the pattern of settlement and development common to much of the western United States. The first known Spanish contact with central Utah was the Dominguez-Escalante Expedition of 1776 to 1777. By the early 1800s, the fur trade was active in Utah, but it declined after 1840 (BLM 1980b).

The Ute Indians continued to control the Price River Basin and STSA until 1877 and the creation of the Uintah and Ouray Indian Reservation. Farmers settled nearby between 1879 and 1882 (O'Neill 1973). The town of Price was established in 1882 in anticipation of the railroad (Lever 1898). Coal was mined in the late 1880s and has continued as the major industry in the area. Bituminous sandstone was first quarried in the STSA in 1892 (Amoco 1982).

Five historic sites lie within the main block. Two sites—the Sunnyside Mine and the Bruin Point-Water Canyon Mine and Tramway—are associated with early mining. The tramway carried bituminous material from the portals to disposal areas in Water and Whitmore canyons. The tramway, considered potentially eligible for listing on the National

Register of Historic Places, may be affected by project activities (Amoco 1982). The other three sites within the Chevron interrelated project area include a scatter of artifacts, old structure foundations, and old coke ovens (Chevron 1982). More historic sites may be found within the main block as surveys are completed.

Exploration and project-related activities could damage historic resources much as they would prehistoric resources. Such a loss of historic information could significantly hinder efforts to reconstruct the region's history. Should the conversion applications and plans of operations be approved, surveys for historic resources would be conducted as described for prehistoric resources. The surveys would be conducted in consultation with the Federal Agency Authorized Officer and the Utah State Historic Preservation Office.

The historic tramway for the Bruin Point-Water Canyon mine could be disturbed by road improvements, and the Sunnyside mine could be disturbed by the area's population increase. These and other historic sites would be evaluated for significance and adverse impacts mitigated to the extent possible and appropriate before surface disturbance would be allowed. Interrelated projects would have the same types of impacts to historic resources as would the proposed actions. The three historic sites within the Chevron interrelated area would be adversely affected by tar sand development.

3.A.11 Paleontology and Mineral Resources

IMPACT SIGNIFICANCE CRITERIA

The impact significance criteria for paleontology and mineral resources are based on professional experience with formations and mineral resources in the STSA and on the paleontological resources known to be associated with deltaic depositional environments. Impacts to geology and mineral resources would be significant if other energy resources (oil, gas, coal, oil shale) could not be recovered. Impacts to paleontology would be significant if fossils of scientific value would be destroyed without their occurrence being recorded.

PALEONTOLOGY

The Sunnyside STSA lies in a portion of Utah that shows a change in the rock record from Cretaceous marine deposition to lower Tertiary (Eocene) nonmarine deposition (135 million to 36 million years ago). The marine deposition represents a sequence of shales interfingered with pulses of shoreline deposits, delta sequences, and beach sands. Coals are commonly found in association with these interfingered deposits, particularly the delta sequences. The nonmarine deposition occurs above the marine sequence and is marked by an erosional unconformity known as the Ohio Creek Conglomerate. Above this unconformity are the Wasatch and Green River formations, which contain the bituminous sandstones.

The Wasatch Formation marks a period of fluvial deposition of sandstones and conglomerates interbedded with shales. This formation contains the bulk of the bituminous sandstones. The lower part of the Wasatch Formation contains few or no fossils because a high energy depositional environment does not lend itself to fossil preservation. The upper portion of the Wasatch Formation contains many trace and body fossils, including bone and plant fragments, fish scales, snails and other small gastropods.

The Green River Formation marks a period of lake bottom deposition of mudstones, sandstones, and shales. The contact with the underlying Wasatch Formation is gradational. Bituminous sandstones in the Green River Formation are concentrated in sandstones in the lower portion; some deposits are found throughout. The many trace and body fossil locations in the Green River Formation contain fish remains, fossil leaves, and other plant remains.

Surface mining of tar sand would destroy many trace fossils and fewer numbers of body fossils. Surface mining would occur mainly in the Roan Cliffs area of the western portion of the main block. In the eastern portion of the main block, the depth of overburden precludes surface mining, and in-situ recovery would be used. With this type of resource recovery, few fossils would be lost because strata overlying the tar sands would be largely undisturbed.

The loss of fossils from surface mining would be a minor impact when compared to the knowledge gained of uncovered fossils and their relationship to

sedimentary facies. Such examination would only be possible in the western, surface-mined portion of the STSA.

MINERAL RESOURCES

The Sunnyside STSA contains 1.6 billion cubic yards of measured, indicated, and inferred bituminous sandstone, half of which is believed to contain at least 9 percent bitumen by weight (Holmes and Page 1956). The terms "measured," "indicated," and "inferred" have been adopted for tar sand from a coal classification system in the Bureau of Mines and Geological Survey Bulletin 1450-B (1976). For their definitions, see "Tar Sand Ore Classification System" in the Glossary.

Measured and indicated bituminous sandstone amounts to 900 million cubic yards, and inferred amounts to 700 million cubic yards. If the bituminous sandstone has a specific gravity of 2.1 and a bitumen content of 9 percent by weight, a cubic yard of bituminous sandstone would weigh 1.77 tons and contain 38.2 gallons of bitumen. On this basis, the measured and indicated bituminous sandstone contains at least 409 million barrels of bitumen, the inferred material contains 318 million barrels, and measured, indicated, and inferred bituminous sandstone contains 728 million barrels, not including material assumed to contain less than 9 percent bitumen (Holmes and Page 1956).

Close to 95 percent of the calculated and estimated reserves of the Sunnyside deposits are in the Wasatch Formation, almost all in sandstones. The estimate by Holmes and Page (1956) arbitrarily limited the reserve downdip from the outcrops in the cliffs. The asphalt-impregnated beds are known to persist for some distance downdip beyond the arbitrary boundary assumed by Holmes and Page. Separate but related deposits are also known to exist to the northwest and southeast. If these uncalculated reserves are added to the below-grade reserves, not included by Holmes and Page, the total reserve is possibly 2.5 to 3 billion barrels (Ball Associates, Limited 1965).

More recent estimates (Ritzma 1979) reveal 3.5 to 4.0 billion barrels of oil in-place, of which 1.25 billion are measured and 1.75 billion indicated. Ritzma ranks the deposit as a "giant" tar sand deposit.

Some question exists over the actual number of barrels of oil in-place due to limited core data. Given the estimated 3.5 to 4.0 billion barrels of the resource and a 330-day production year, the potential exists for about 2.8 billion barrels of bitumen to be removed from the main block as a result of the cumulative effects of the applicants' proposed tar sand developments and the Chevron interrelated tar sand project. Removal of this amount of resource represents about 70 percent of the resource estimated to occur in the STSA. Applicant projects would collectively account for 2.6 billion barrels of this total. Removal of these amounts would represent 74 percent of the estimated resource in the STSA.

Other mineral resources are found in close association with the tar sand. Most well-known in the region is oil shale. In the Sunnyside area, however, the oil shales tend to be thin, discontinuous, low-grade deposits.

The main block has some coal deposits at depths below the tar sand in association with marine shales, but none of these deposits can be extracted by underground mining because of their depth of burial. Impacts to coal operations would thus be small.

The spent sand disposal site in Bear Canyon would cover an area that might be needed for ancillary facilities for a proposed underground coal mine but would not prevent coal production. For a detailed discussion of the B Canyon mine, see USGS 1979.

Oil and gas operations near Cottonwood Canyon and other future operations in and near the main block would not be affected by the proposed tar sand projects. The oil, gas, and tar sand would be leased by the same lessee.

3.A.12 Wilderness Resources

IMPACT SIGNIFICANCE CRITERIA

Direct impacts are considered significant if any proposed conversion area or related facilities or any interrelated project would cross the boundary of a BLM-administered wilderness study area (WSA), which is subject to the Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM 1980c).

Indirect, secondary impacts that would permanently alter a WSA's wilderness characteristics were also considered significant. Examples of significant indirect, secondary impacts include water quality degradation that would permanently impair an area's naturalness characteristic, such as fishing opportunities within a wilderness unit, or a major increase in wilderness unit visitors that would jeopardize solitude and natural characteristics.

Three BLM-administered areas under review and study for potential wilderness designation lie outside the main block but within the area of influence that could be affected by proposed tar sand development: Turtle Canyon WSA (UT-060-067), Desolation Canyon WSA (UT-060-068A), and Jack Canyon WSA (UT-060-0680) (BLM 1980a).

These WSAs are managed under the BLM's Wilderness Management Policy. Any development that would directly or indirectly affect WSAs would be subject to the Interim Management Policy nonimpairment criterion (BLM 1979). Under this criterion, only temporary uses that are largely unnoticeable would be allowed, and wilderness suitability of the WSAs could not be impaired. Permanent and substantially noticeable intrusions to the wilderness resource would be considered violations of the nonimpairment criteria and therefore not allowable under the provisions of the Section 103(c) Federal Land Policy and Management Act. Lease rights for oil and gas development issued before October 21, 1976, would not be subject to the nonimpairment standard.

TURTLE CANYON WSA

The north boundary of this 33,690-acre WSA lies 7 miles southeast of Sunnyside and 5 miles south of the STSA. The WSA's east boundary parallels Range Creek. The headwaters of Range Creek and its tributaries flow within the STSA and pass through Mono's proposed conversion area (9 miles north of the WSA).

The WSA contains a highly dissected, rugged topography with areas of dense vegetation. It remains entirely natural and has a variety of wildlife. The rugged ridges and steep canyon walls provide excellent opportunities for solitude and primitive and unconfined recreation, including hunting, hiking, and horseback riding. The rugged setting adds challenges to these activities. In a preliminary finding, BLM recommended the entire 33,690-acre unit as suitable for wilderness designation (BLM 1983d).

DESOLATION CANYON WSA

The 289,650-acre Desolation Canyon WSA lies next to and east of the STSA (Map 3-5, map pocket of draft EIS), 10 miles east of Sunnyside. Because of the unit's large size; its diversity of topography, vegetation, and wildlife; and the many primitive recreation activities that occur, users commonly refer to it as the Green River Wilderness. Wilderness-type recreation uses (hunting, hiking, horseback riding, and especially floatboating) are well established. Support for wilderness designation of a major portion of the WSA has been also expressed by the Utah Governor's Wilderness Committee.

In a preliminary finding, BLM recommended 230,000 acres of Desolation Canyon WSA as suitable for wilderness designation (BLM 1983c). On the basis of the Interior Board of Land Appeals decision in May 1983 and public review comments, BLM increased the recommended WSA size to 289,650 acres. BLM is now studying the recommended WSA for wilderness suitability.

JACK CANYON WSA

The 7,500-acre Jack Canyon WSA lies 16 miles northeast of Sunnyside near Upper Jack Creek Canyon and Pine Springs Draw (Map 3-5, map pocket of draft EIS). The closest proposed conversion area would be Sabine's, 3 miles west of the WSA. Jack Canyon WSA was originally part of BLM's Desolation Canyon initial (roadless area) inventory unit but was eliminated from the unit after the intensive (wilderness character) inventory. When environmental groups appealed the decision to eliminate this area from further study, the Jack Canyon drainage became an "appeal area." Finally, an Interior Board of Land Appeals decision formally designated the area as a WSA, which is separated from Desolation Canyon WSA by a road.

No significant direct impacts would occur to the Turtle Canyon, Desolation Canyon, or Jack Canyon WSAs because none of the proposed conversion areas overlie these unit boundaries.

A potential exists for secondary impacts to wilderness values from air and water quality deterioration. Wilderness values of Desolation Canyon and Jack Canyon WSAs (especially at vista points in northern portions) could be impaired by surface mining, plantsite emissions, and fugitive dust from spent sand disposal and the movement of heavy construction equipment along dirt roads. Plumes might be seen against the sky or a light background due to nitrous oxides from applicant projects. Particulate emissions could contribute to perceptible contrasts and visual range reductions within the WSAs. Additionally, the sight of surface mining or in-situ recovery facilities could diminish the solitude and natural experiences of wilderness users.

Impacts to Range Creek could significantly degrade water quality within Turtle Canyon and Desolation Canyon WSAs. The quality of trout fishing could be diminished by increased water temperatures resulting from mining on Mono's proposed conversion area and potential leachate from the spent sand area along the upper reaches of Range Creek (Section 3.A.1, Water Resources; Section 3.A.4, Wildlife). Primitive recreation experiences could be diminished through the impairment of natural values along the Range Creek drainage of both WSAs.

Collectively, population growth in Carbon and Emery counties, Utah, due to the applicant projects would not significantly impair the wilderness-related values of the Turtle Canyon, Desolation Canyon, or Jack Canyon WSAs. (See Section 3.A.2, Socioeconomics, for population statistics.) The cumulative population increases of applicant and interrelated projects, however, would impair such resources in these units. Increased visitors could compromise naturalness and solitude characteristics. New jeep trails could be created within accessible portions of the WSAs, and incidences of poaching and wanton killing of wildlife within the WSAs would be more likely (Bradley 1976). The likelihood would also increase for destruction and vandalism of cultural and other resources enjoyed by wilderness users.

3.A.13 Conflicts with Land Use Plans, Policies, and Constraints

IMPACT SIGNIFICANCE CRITERIA

Any identified conflicts between project facilities or activities and land use plans, regulations, or controls adopted or under official consideration by federal, state, or local governments would be significant.

IMPACTS

Some of the applicants' proposed plans of operations would conflict with restrictions on development within 4,040 acres of special watershed management areas. These areas have been withdrawn or restricted from activities that could degrade water resources. A management decision by BLM would be needed to approve development on areas that would affect the watershed management areas. For a complete discussion of the laws that apply to the special watershed areas, see Appendix A-5, Water Resources.

Proposals to develop areas around Bruin Point could conflict with BLM's management framework plan and Title V Section 501 (a) (5) of the Federal Land Policy and Management Act if the applicants restrict the use of Bruin Point as a communication equipment location.

Development could conflict with the land use plans of Carbon County, the towns of Sunnyside and East Carbon, and BLM, but specific conflicts cannot be identified because project designs are not well enough developed. Both collectively and cumulatively, nonconformance with these plans could be resolved by amending them to eliminate significant conflicts.

Amendments to BLM land use plans using this EIS to analyze the impacts are only possible if the impacts fall within the scope of the presentation in this EIS. Where this EIS documents the impacts of these potential land use changes it can be used by the decision maker as rationale for authorizing the change. The "alternative of project conformance to the environmental protection aspects of these (existing) plans" is no change but rather the presently authorized direction that is the basis for Chapter 3, Affected Environment and Environmental Consequences, and therefore needs no further analysis.

3.B PARTIAL CONVERSION AND/OR SPECIAL MITIGATION ALTERNATIVE

Under the partial conversion and/or special mitigation alternative (the partial conversion alternative),

only part of the land proposed for conversion would be approved and developed (Map 1-5, map pocket of draft EIS). Partial conversion would not involve critical areas (as defined in Section 1.B, Partial Conversion Alternative) that would undergo significant adverse impacts under the proposed actions. The analysis under this alternative assumed that one 75,000-barrel per day (bpd) tar sand processing plant (centrally located near Sunnyside) and one steam generation plant in support of a 5,000 bpd in-situ recovery operation (in the northeast portion of the main block) would be built and operated for the conversion areas. The analysis further assumed that the conversion areas would support an 80,000-bpd industry for 45 years. See Section 1.B, Partial Conversion Alternative, for more details on this alternative.

3.B.1 Water Resources

The main effect of partial conversion on water resources would be to reduce surface disturbance in watersheds that are or have the potential to be used as culinary water sources. This alternative would protect the headwaters of Range Creek and the Right Fork of Grassy Trail Creek, two areas critical to the high quality waters on the main block. Table 3-26 summarizes the watershed impacts of this alternative. In addition to protecting the headwaters of streams, special watershed management areas that would conflict with current withdrawals would decline to 1,280 acres.

GRASSY TRAIL CREEK WATERSHED

Partial conversion could collectively disturb 2,728 acres, and partial conversion and interrelated projects could cumulatively disturb 5,577 acres in Grassy Trail Creek watershed. But these disturbances would little affect water resources in the watershed because the areas that would be disturbed are far from critical water resources.

This type of disturbance would not significantly change the quality and quantity of water entering Grassy Trail Reservoir because most of the headwater areas would remain undisturbed. This alternative's spent sand disposal area would lie outside the reservoir drainage area and would not alter existing flows or quality. Total dissolved solids, however, might increase in Grassy Trail Creek downstream from the reservoir.

TABLE 3-26
SUMMARY OF WATERSHED IMPACTS
(Partial Conversion Alternative)

Watershed	Land Disturbance (acres) Collective	Cumulative	Potential to Exceed State Standards	Springs Total in Watershed	Number Affected	Deep Aquifer	Floodplains	Other
Grassy Trail Creek	2,728	5,577	Very low	18	0	No affect	No affect	Minor downstream TDS increase
Nine Mile Creek	18,590	18,590	High*	85	35	Little or no changes in discharge due to some mine dewatering	Minor alteration	Minor TDS increase in tributary streams

Note: TDS = total dissolved solids.
*During thunderstorms and exceptional spring runoff.

NINE MILE CREEK WATERSHED

Partial conversion could collectively disturb 18,590 acres in Nine Mile Creek watershed, but interrelated projects would not affect this watershed. Impacts would be similar to those discussed for this watershed under the proposed actions (Section 3.A.1, Water Resources).

In addition to minimizing the impacts on the various watersheds, partial conversion would require less process water, and changes in waterflow and water quality would differ from that under the proposed actions. Water use for commercial operation could deplete two streams—the Price River and the Green River. Predicted changes in waterflow and water quality are shown in Table 3-27.

TABLE 3-27
CHANGES IN WATER FLOW AND QUALITY
(Partial Conversion Alternative)

	Price River		Green River	
Parameter	**Collective**	**Cumulative**	**Collective**	**Cumulative**
Annual Water Use[a] (ac-ft)	12,000	12,000	8,738	13,238
Percent reduction in flow	16%	16%	<1%	<1%
TDS Change	little or no change	little or no change	<1 mg/l	<1 mg/l

Note: ac-ft = acre-feet; mg/l = million grams per liter; TDS = total dissolved solids
[a]Total water use as measured at Green River, Utah, would be 25,238 ac-ft/yr.

3.B.2 Socioeconomics

This analysis is also based on the Socioeconomic Technical Report: Sunnyside Special Tar Sand Area Development Analysis (Argonne National Laboratory 1984). The analysis in the technical report, however, is adjusted to allow an estimate of impacts in the peak construction year of 1989. The method used to make these adjustments is described in Appendix A-6, Socioeconomics.

The technical report provides detailed data on historical and current socioeconomic conditions in the area of influence, assumptions for the baseline projections and the interrelated projects, and an analytical methodology. Appendix A-6, Socioeconomics, describes the area of influence and the Socioeconomic Technical Report presents the work force assumptions for the interrelated projects.

POPULATION AND EMPLOYMENT

A description of historical and current population and employment trends and the projected effects of the interrelated projects is included in the discussion of the proposed actions (Section 3.A.2, Socioeconomics).

Under partial conversion, the applicants' construction work force would peak in 1987 at 1,877, and the permanent operation work force would peak in 2003 at 3,695 (Table 1-12). Partial conversion would cause a population increase of 17,840, a 34 percent increase over the 2005 baseline by 2005 (Table 3-28). Partial conversion and interrelated projects would cumulatively cause a population increase of 39,100 by 2005, a 75 percent increase over the 2005 baseline.

TABLE 3-28
POPULATION IMPACTS
(Partial Conversion Alternative)

	1980	1989	2005	1980	1989	2005
		Total Area of Influence			Carbon County	
Baseline Population	33,630	48,190	51,830	22,179	33,520	37,280
Applicants' Collective Impacts		10,080	17,840		8,880	16,290
Percent Increase Over Baseline		21	34		26	44
Interrelated Projects		14,280	21,260		13,260	20,110
Cumulative Impacts		24,360	39,100		22,140	36,400
Percent Increase Over Baseline		51	75		66	98
Total Population	33,630	72,500	90,930	22,179	55,660	73,680
		East Carbon			Sunnyside	
Baseline Population	1,942	1,280	995	611	400	315
Applicants' Collective Impacts		1,860	3,640		650	1,280
Percent Increase Over Baseline		145	366		162	406
Interrelated Projects		1,450	1,580		510	550
Cumulative Impacts		3,310	5,220		1,160	1,830
Percent Increase Over Baseline		259	525		290	581
Total Population	1,942	4,590	6,215	611	1,560	2,145
		Helper			Unincorporated Areas of Helper CCD	
Baseline Population	2,724	3,820	4,100	1,729	2,450	2,660
Applicants' Collective Impacts		420	520		280	350
Percent Increase Over Baseline		11	13		11	13
Interrelated Projects		440	1,160		290	780
Cumulative Impacts		860	1,680		570	1,130
Percent Increase Over Baseline		23	41		23	42
Total Population	2,724	4,680	5,780	1,729	3,020	3,790
		Price			Wellington	
Baseline Population	9,086	15,700	18,500	1,406	2,510	2,800
Applicants' Collective Impacts		3,630	6,820		1,010	1,890
Percent Increase Over Baseline		23	37		40	68
Interrelated Projects		6,870	10,420		1,900	2,890

TABLE 3-28 (Continued)
POPULATION IMPACTS
(Partial Conversion Alternative)

	1980	1989	2005	1980	1989	2005
Cumulative Impacts		10,500	17,240		2,910	4,780
Percent Increase Over Baseline		67	93		116	171
Total Population	9,086	26,200	35,740	1,406	5,420	7,580
	Unincorporated Areas of Price CCD			Emery County[a]		
Baseline Population	4,327	6,960	7,500	11,451	14,670	14,550
Applicants' Collective Impacts		950	1,780		1,200	1,550
Percent Increase Over Baseline		14	24		8	11
Interrelated Projects		1,800	2,730		1,020	1,150
Cumulative Impacts		2,750	4,510		2,220	2,700
Percent Increase Over Baseline		40	60		15	19
Total Population	4,327	9,710	12,010	11,451	16,890	17,250
	Castle Dale			Cleveland		
Baseline Population	1,910	2,850	2,850	522	600	600
Applicants' Collective Impacts		290	430		50	70
Percent Increase Over Baseline		10	15		8	12
Interrelated Projects		270	320		40	60
Cumulative Impacts		560	750		90	130
Percent Increase Over Baseline		20	26		15	22
Total Population	1,910	3,410	3,600	522	690	730
	Elmo			Huntington		
Baseline Population	300	370	360	2,316	2,970	2,850
Applicants' Collective Impacts		30	50		210	310
Percent Increase Over Baseline		8	14		7	11
Interrelated Projects		30	40		190	230
Cumulative Impacts		60	90		400	540
Percent Increase Over Baseline		16	25		13	19
Total Population	300	430	450	2,316	3,370	3,390

TABLE 3-28 (Concluded)
POPULATION IMPACTS
(Partial Conversion Alternative)

	1980	1989	2005	1980	1989	2005
		Orangeville			Unincorporated Areas of Castle Dale-Huntington CCD	
Baseline Population	1,309	1,970	1,970	1,489	1,570	1,570
Applicants' Collective Impacts		210	310		40	60
Percent Increase Over Baseline		11	16		3	4
Interrelated Projects		190	230		40	50
Cumulative Impacts		400	540		80	110
Percent Increase Over Baseline		20	27		5	7
Total Population	1,309	2,370	2,510	1,489	1,650	1,680
		Green River			Unincorporated areas of Green River CCD	
Baseline Population	956	960	1,000	166	160	170
Applicants' Collective Impacts		310	260		50	40
Percent Increase Over Baseline		32	26		31	24
Interrelated Projects		190	90		30	10
Cumulative Impacts		500	350		80	50
Percent Increase Over Baseline		52	35		50	29
Total Population	956	1,460	1,350	166	240	220

Note: CCD = Census County Division.
[a]Includes insignificant impacts to the Emery-Ferron CCD.

Carbon County would undergo the greater population growth. In 2005, its population would increase by 44 percent over baseline as a result of the applicant projects and by 98 percent over baseline as a result of applicant and interrelated projects.

Price would undergo the greatest community population growth as a result of partial conversion, but Sunnyside, East Carbon, and Wellington would have the greatest population growth relative to baseline, with increases in 2005 of 406 percent (applicants) and 581 percent (cumulative) in Sunnyside, 366 percent (applicants) and 525 percent (cumulative) in East Carbon, and 68 percent (applicants) and 171 percent (cumulative) in Wellington. Under a significance criterion of a 5 percent or more increase over the baseline, the populations of both counties and all communities in the area of influence would significantly increase under partial conversion. Populations of some unincorporated areas within Carbon County are also expected to substantially increase. Applicant projects would increase the population of the unincorporated portion of the Price Census County Division in 2005 by 24 percent over baseline; with interrelated projects, the increase over baseline would be 60 percent.

Table 3-29 presents employment data for the affected counties. Employment statistics do not exist for community-level analysis. For the area of influence, total employment in 2005 is expected to increase by 32 percent over the baseline as a result of applicant projects and 71 percent as a result of the applicant and interrelated projects.

TABLE 3-29
EMPLOYMENT IMPACTS
(Partial Conversion Alternative)

	1980	1989	2005	1980	1989	2005
	Total Area of Influence			Carbon County		
Baseline Employment	14,837	20,360	22,900	9,385	13,690	16,020
Applicants' Collective Impacts		4,920	7,630		4,740	7,090
Percent Increase Over Baseline		24	32		35	44
Interrelated Projects		7,060	8,940		6,340	8,100
Cumulative Impacts		11,980	16,300		11,080	15,190
Percent Increase Over Baseline		59	71		81	95
Total Employment	14,837	32,340	39,200	9,385	24,770	31,210
	Emery County					
Baseline Employment	5,452	6,670	6,880			
Applicants' Collective Impacts		180	270			
Percent Increase Over Baseline		3	4			
Interrelated Projects		720	840			
Cumulative Impacts		900	1,110			
Percent Increase Over Baseline		13	16			
Total Employment	5,452	7,570	7,990			

By 2005, Carbon County employment would increase by more than 40 percent over baseline as a result of applicant projects and would nearly double the baseline with the interrelated projects included. Emery County would experience only a 4 percent employment growth from applicant project, but its employment growth would rise to 16 percent with inclusion of interrelated projects. Thus, applicant and interrelated projects would cumulatively cause employment in both counties to significantly increase, but only Carbon County's employment would significantly increase as a result of applicant projects alone.

PERSONAL INCOME

Partial conversion would significantly increase the area's per capita personal income (PCPI) over the projected baseline level during peak construction. In 1989, this alternative would raise PCPI to $11,295, a 10 percent increase over the baseline projection of $10,243 (both in 1980 dollars).

Although existing mining gives the area of influence a relatively high PCPI, partial conversion would not increase the area's PCPI significantly over the level projected for the baseline from applicant projects alone during operation. Partial conversion would increase PCPI cumulatively with the interrelated projects. By 2005, applicant and interrelated projects would raise PCPI to $13,516, as compared to the baseline projection of $12,602 (both in 1980 dollars). This 7 percent increase would be significant.

Most personal income increases would occur in Carbon County. By 1989, 88 percent of total personal income increases would occur in Carbon County as a result of applicant projects. By 2005, 91 percent of these increases would occur in Carbon County. The cumulative increase would be even greater, with 91-93 percent of the total personal income increase occurring in Carbon County.

The $366 million (1980 dollars) increase in personal income for the area of influence by 1989 and the $576 million increase by 2005 are likely to significantly raise the cost of consumer goods and services and the cost of housing. Significant local price inflation could result from the local increase in purchasing power, economically hurting those with fixed incomes such as elderly and those lacking the skills to be employable in higher income jobs.

The impacts of partial conversion would seriously test the ability of the affected communities to provide adequate and affordable housing. Table 3-30 shows the increased demand for housing that would result from applicant projects, interrelated projects, and applicant and interrelated projects. The 1980 column shows the total housing supply in 1980. For the socioeconomic area of influence, applicant projects would increase housing demand by 32 percent over baseline by 2005, and applicant and interrelated projects would increase housing demand by 72 percent by 2005. Most of the housing demand increases would occur in Carbon County. Price would experience the greatest absolute housing demand increases of the communities in the area of influence. Sunnyside, East Carbon, and Wellington, however, would experience the greatest housing demand increases over baseline. Under a significance criterion of 5 percent over baseline, housing demand would significantly increase in all communities. Increased housing demand would benefit the housing construction and finance industries, but a limited housing supply could contribute to land speculation and increased housing costs in all of the significantly affected communities, except possibly Cleveland, Elmo, and Green River.

LOCAL GOVERNMENT SERVICES AND FACILITIES

The assessments of local government services and facilities are based on estimates derived from the Socioeconomic Technical Report (Argonne National Laboratory 1984). The method used to derive the estimates for the peak construction year is described in Appendix A-6, Socioeconomics.

Education

Significant increases in teachers and classrooms over the projected baseline would be required in the area of influence under partial conversion. Carbon County would be the most severely affected, having a demand for 200 more teachers and classrooms by 2005 as a result of applicant projects. This increase would represent a 106 percent increase over the number required by baseline growth. Applicant and interrelated projects would increase Carbon County's demand for teachers and classrooms by 440 or 233 percent by 2005. By 2005, Emery County's demand for teachers and classrooms would significantly increase by 12 (20 percent) due to applicant tar sand development alone and by 26 (43 percent)

TABLE 3-30
HOUSEHOLD PROJECTIONS
(Partial Conversion Alternative)

	1980[a]	1989	2005	1980[a]	1989	2005
	Total Area of Influence			Carbon County		
Baseline Households	11,454	14,590	15,670	7,794	10,570	11,700
Applicants' Collective Impacts		3,500	5,050		3,080	4,600
Percent Increase Over Baseline		24	32		29	39
Interrelated Projects		4,790	6,180		4,440	5,850
Cumulative Impacts		8,290	11,230		7,520	10,450
Percent Increase Over Baseline		57	72		71	89
Total Households	11,454	22,880	26,900	7,794	18,090	22,150
	East Carbon			Sunnyside		
Baseline Households	714	400	310	206	130	100
Applicants' Collective Impacts		650	1,030		230	360
Percent Increase Over Baseline		162	332		177	360
Interrelated Projects		500	460		170	160
Cumulative Impacts		1,150	1,490		400	520
Percent Increase Over Baseline		288	481		308	520
Total Households	714	1,550	1,800	206	530	620
	Helper			Unincorporated Areas of Helper CCD		
Baseline Households	1,074	1,200	1,280	659	790	840
Applicants' Collective Impacts		150	150		100	100
Percent Increase Over Baseline		12	12		13	12
Interrelated Projects		150	340		100	230
Cumulative Impacts		300	490		200	330
Percent Increase Over Baseline		25	38		25	39
Total Households	1,074	1,500	1,770	659	990	1,170
	Price			Wellington		
Baseline Households	3,195	4,950	5,790	433	790	900
Applicants' Collective Impacts		1,270	1,930		350	530
Percent Increase Over Baseline		26	33		44	59
Interrelated Projects		2,290	3,030		630	840

TABLE 3-30 (Continued)
HOUSEHOLD PROJECTIONS
(Partial Conversion Alternative)

	1980[a]	1989	2005	1980[a]	1989	2005
Cumulative Impacts		3,560	4,960		980	1,370
Percent Increase Over Baseline		72	86		124	152
Total Households	3,195	8,510	10,750	433	1,770	2,270
	Unincorporated Areas of Price CCD			Emery County[b]		
Baseline Households	1,365	2,190	2,350	3,660	4,020	3,970
Applicants' Collective Impacts		330	500		420	450
Percent Increase Over Baseline		15	21		10	11
Interrelated Projects		600	790		350	330
Cumulative Impacts		930	1,290		770	780
Percent Increase Over Baseline		42	55		19	20
Total Households	1,365	3,120	3,640	3,660	4,790	4,750
	Castle Dale			Cleveland		
Baseline Households	622	780	780	156	170	160
Applicants' Collective Impacts		100	120		20	20
Percent Increase Over Baseline		13	15		12	12
Interrelated Projects		90	90		20	20
Cumulative Impacts		190	210		40	40
Percent Increase Over Baseline		24	27		24	25
Total Households	622	970	990	156	210	200
	Elmo			Huntington		
Baseline Households	90	100	100	757	810	780
Applicants' Collective Impacts		10	10		70	90
Percent Increase Over Baseline		10	10		9	12
Interrelated Projects		10	10		60	70
Cumulative Impacts		20	20		130	160
Percent Increase Over Baseline		20	20		16	21
Total Households	90	120	120	757	940	940

TABLE 3-30 (Concluded)
HOUSEHOLD PROJECTIONS
(Partial Conversion Alternative)

	1980[a]	1989	2005	1980[a]	1989	2005
		Orangeville		Unincorporated Areas of Castle Dale-Huntington CCD		
Baseline Households	397	540	530	414	440	430
Applicants' Collective Impacts		70	90		10	20
Percent Increase Over Baseline		13	17		2	5
Interrelated Projects		60	70		10	10
Cumulative Impacts		130	160		20	30
Percent Increase Over Baseline		24	30		5	7
Total Households	397	670	690	414	460	460
		Green River		Unincorporated areas of Green River CCD		
Baseline Households	388	260	270	37	40	50
Applicants' Collective Impacts		110	70		20	10
Percent Increase Over Baseline		42	26		50	20
Interrelated Projects		70	20		10	5
Cumulative Impacts		180	90		30	15
Percent Increase Over Baseline		69	33		75	30
Total Households	388	440	360	37	70	65

Note: CCD = Census County Division.
[a]Total available stock of year-round housing units.
[b]Includes insignificant impacts to the Emery-Ferron CCD.

with the addition of interrelated projects. Such large increases in classrooms would require expanding the school systems to about equal this demand, since the baseline demand would eliminate all existing capacity in Carbon County and 77 percent of existing capacity in Emery County.

Medical Services

Medical services and facilities would be severely strained by partial conversion because no more capacity would exist to support the increased demand caused by the applicant and interrelated projects. Even under baseline demand, more physicians, dentists, and hospital beds will be needed by 1985. The demand would be highest in Carbon County, but Emery County could also be highly affected if services continue to be lacking by that time. Under partial conversion, the area of influence would need 11 more physicians and 10 more dentists (92 percent and 100 percent, respectively, over baseline demand) by 2005 as a result of applicant proposed projects. A 72 percent increase in hospital beds would also be needed in the socioeconomic area of influence by 2005. By 2005, applicant and interrelated projects would raise these needs to 24 physicians (200 percent increase), 20 dentists (200 percent increase), and 135 hospital beds (159 percent increase).

Social and Mental Health Services

Understaffing and rising case loads now affect social and mental health services in the area of influence. It is estimated that 1 more psychologist and 10 more social workers would be needed as a result of baseline growth in the next 10 years (Walker 1983). Increased population caused by applicant and interrelated projects would create a further need for 1 psychologist and 26 social workers by 2005.

Law Enforcement

Partial conversion would significantly increase the demand over baseline for law officers and patrol cars in the area of influence. By 2005, such demand in Carbon County would increase over baseline by 106 percent for law officers and patrol cars as a result of applicant projects and by 235 percent as a result of applicant and interrelated projects. The percentage increase in Emery County's demands would be 57 and 86 percent, respectively, representing, however, four to six more officers and patrol cars. Jails would also have to be expanded, particularly in Carbon County where the jail is already overcrowded.

Fire Protection

More fire equipment could be needed in the area of influence, but existing data does not allow numerical estimates. Some communities might no longer be able to rely on volunteer fire departments.

Sewage Disposal

Sewage system capacity figures are not available for several of the communities, but the system in Cleveland and Elmo and the combined Castle Dale-Orangeville system should be adequate for the cumulative population growth projected under the partial conversion alternative. The systems in both East Carbon (including Sunnyside) and Huntington would be overloaded by the construction peak in 1989. The combined system of Price, Helper, and Wellington is now over design capacity. A planned expansion of the system to a capacity large enough for a population of 31,500 would still fall short of the needs in the peak construction year of 1989, when a combined population of 36,700 is projected for the three towns.

Solid Waste Disposal

Under partial conversion, impacts to solid waste disposal systems would be similar but less extensive than those discussed for the proposed actions.

Water

Increased demands for water in the area of influence resulting from the applicants' tar sand development under partial conversion would significantly exceed increases required as a result of baseline growth in both Carbon and Emery Counties. By 2005, applicant projects would increase water demand in Carbon County by 108 percent over baseline as measured by the number of water system connections, and applicant and interrelated projects would increase water demand by 241 percent over baseline. In Emery County, the comparable increases would be 50 and 87 percent.

Existing information on the community water systems reveals that some have little or no excess capacity of connections. In Carbon County, the Price water treatment plant's design capacity is considered well under peak demand. Scofield Reservoir, the sole source of water for Wellington and the unincorporated area surrounding Price and Wellington, is being used at 50 to 60 percent of its capacity. In Emery County, the system that serves Cleveland, Elmo, Green River, Huntington, Orangeville, and Castle Dale would have enough connections to accomodate the cumulative population growth under partial conversion and interrelated projects.

LOCAL GOVERNMENT FINANCE

Current financial data on counties, communities, and other taxing districts in the area of influence is included in Section 3.A, Proposed Actions, and more fiscal information is provided in the Socioeconomic Technical Report.

Severe fiscal pressure is expected to result from partial conversion unless mitigated by the applicants with some federal and state assistance. The rapid population growth would immediately increase service demands. Revenues would lag initially, and coordinated mitigation planning, such as required by Utah Code Annotated Section 63-51-10 (Supp. 1981)(Senate Bill 170) and Carbon County (conditional use permit), would be needed to avoid severe short-term service inadequacies.

Because demands on local infrastructure from baseline growth would in many cases equal or exceed the present capacities of these services, the additional demands that would be imposed by applicant developments and interrelated projects would require significant increases in capacity, particularly in Carbon County. Jails, classrooms, medical facilities, water and sewer systems, and probably other facilities not included in this analysis would need to be expanded. Most of the additional capacity would be needed to meet demands of the construction period, but the largest part of the increased revenues from the developments would become available only after the beginning of mining operations. Moreover, because the mines would be developed in unincorporated areas, those revenues would accrue largely to the counties rather than to the communities that would bear much of the infrastructure costs.

Operating expenses would be increased by needs for larger administrative and professional staffs, greater demands on public safety and social welfare services, and greater operation and maintenance costs of the expanded infrastructure.

OTHER AFFECTED INDUSTRIES

Utah Division of Wildlife Resources data reveals that under the partial conversion collective scenario, Carbon County hunter expenditures would increase by $1,467 from 1980 to 1985 and by $208,900 from 1980 to 1995 and expenditures for nonconsumptive uses of wildlife would increase by $1,573 from 1980 to 1985 and by $223,394 from 1980 to 1995.

Under the cumulative scenario, hunting expenditures would increase by $108,710 between 1980 and 1985 and by $574,998 between 1980 and 1995, and expenditures for nonconsumptive uses of wildlife would increase by $116,155 between 1980 and 1985 and by $914,859 between 1980 and 1995.

QUALITY OF LIFE

Local social changes due to projected population growth could be significant under partial conversion, particularly in East Carbon, Sunnyside, and Wellington. These changes are described in detail in Section 3.A.2 (Proposed Actions, Socioeconomics).

3.B.3 Soils and Vegetation

Partial conversion would collectively disturb 21,318 acres of soils and vegetation over the life of the projects (Table 1-11). Conversion-related development and interrelated projects would cumulatively disturb 24,218 acres. During the 25-year period of steady-state operations, at any one time an average of 5,000 acres would be collectively disturbed, and at most 5,500 acres would be cumulatively disturbed (Figure 2-1, Chapter 2). Land would be disturbed over a project life of 49 years (initial construction through the closing of commercial operations and reclamation).

Construction of right-of-way facilities for developing conversion areas would collectively disturb 1,855 acres and cumulatively disturb 2,155 acres for 1 to 2 years.

Surface mining and in-situ recovery would disturb 14,846 acres.

Spent sand disposal areas would disturb 5,355 acres, of which all would lie outside the STSA, southwest of Sunnyside in the Clark's Valley area (climatic zone C, Map 3-2, map pocket of draft EIS).

SOILS

Table 3-31 shows the collective and cumulative acreages disturbed.

Even though soil impacts would occur, the applicants' proposed reclamation procedures and BLM-required procedures (Appendix A-7) would prevent disturbances from causing significant soil losses or reductions in productivity. Some localized, very steep areas (5 to 8 percent of the total area) resembling talus-like slopes with a low productive capacity, however, could remain in the reclaimed landscape. In size and productivity, these areas would equate to the preconstruction occurrence of rock outcrop (canyon walls and escarpments). The mining disturbance and complete altering of existing soil profiles and landscape would cause short-term losses of soil productivity and an increase in erosion losses from wind and water from initial disturbance until reclamation and during the establishment of understory plants.

VEGETATION

Partial conversion would affect similar vegetation types and have similar impacts to the proposed actions (Section 3.A.3, Soils and Vegetation), but partial conversion would not disturb as large an area. Table 3-32 shows estimated total collective and cumulative disturbed acres by vegetation type. Some

TABLE 3-31
ACRES OF SOIL GROUPS AFFECTED AND DISTURBED
(Partial Conversion Alternative)

Type of Disturbance	Totel Acres Disturbed[a]	Soil Group A[b]	F	M1	M2	M3	MS1	MS2	MS3	Undetermined[c]
Collective Totals										
Leasas[d]	14,846	358	254	476	2,538	864	158	6,815	3,485	0
Mine (Surfaca)	9,436	324	—	42	1,347	858	28	3,734	3,103	0
Plant and Spent Sand Disposal	4,617(262)	286	3,887	80	0	0	364	0	0	0
Plant and In-Situ Mining	5,410	32	254	434	1,191	6	130	2,881	482	0
Ancillary Facilities	1,855(245)	0	0	0	0	0	0	0	0	1,855
Total	21,318	642	4,141	556	2,538	864	522	8,815	3,585	1,855
Interralatad Projects Totals										
Mina (Surfaca)	1,400	0	0	0	0	118	0	1,223	59	0
Plant and Spent Sand Disposal	1,200(200)	0	1,200	0	0	0	0	0	0	0
Ancillary Facilitias	300	0	0	0	0	0	0	0	0	300
Total	2,900	0	1,200	0	0	118	0	1,223	59	300
Cumulativa Total										
Laases[d]	14,846	356	254	476	2,538	864	158	6,615	3,485	0
Mina (Surface)	10,836	324	0	42	1,347	978	28	4,957	3,162	0
Mina (In-Situ)	5,410	32	254	434	1,191	6	130	2,881	482	0
Plant & Spent Sand Disposal	5,817	286	5,087	80	0	0	364	0	0	0
Ancillary Facilities	2,155(445)	0	0	0	0	0	0	0	0	2,155
Total	24,218	642	5,341	556	2,538	982	522	7,838	3,644	2,155

Note: Figures shown in parentheses are acreages that would be removed (plant sites and roads) for life of project. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of project.

[b]Includes measured, delineated areas of flood plain soils; additional small areas not mappable due to map scale occur throughout the area of influence.

[c]Acreages not determined because locations of facilities are unknown at this time.

[d]Total lease area to be converted that is included in this alternative.

significant adverse vegetation impacts could occur; the significance and acreage involved would depend on the success of proposed reclamation programs (Appendix A-7)

Significant impacts could occur in areas disturbed in the low precipitation zones (climatic zones B and C, Map 3-2, map pocket of draft EIS), where ground cover might not be established within 5 years. Other significant impacts would result from applicants being unable to restore the pre-project vegetation type diversity (mainly shrubs and trees) due to changes in topography, slope, and aspect causing microclimatic changes. The 5,502 acres of aspen and conifer vegetation types would be most greatly disturbed. These vegetation impacts would also affect wildlife (Section 3.B.4) and grazing (Section 3.B.9).

TABLE 3-32
ACRES OF VEGETATION TYPES AFFECTED AND DISTURBED
(Partial Conversion Alternative)

Type of Disturbance	Total Acres Disturbed[a]	Riparian[b]	Salt Shrub	Pinyon-Juniper	Sagebrush-Grass	Mountain Shrub	Aspen	Mixed Conifer	Undetermined[c]
Collective Totals									
Leases[d]	14,846	286	0	1,722	3,082	5,456	1,385	2,915	0
Mine (Surface)	9,436	254	0	433	1,079	3,958	1,142	2,570	0
Plant and Spent Sand Disposal	4,617(262)	192	0	3,544	89	782	0	0	0
Plant and In-Situ Mining	5,410	32	0	1,289	2,003	1,498	242	346	0
Ancillary Facilities	1,855(245)	0	0	0	0	0	0	0	1,855
Total	21,318	478	0	5,276	3,171	6,238	1,384	2,916	1,855
Interrelated Projects Totals									
Mine (Surface)	1,400	0	0	0	58	140	373	829	0
Plant and Spent Sand Disposal	1,200(200)	0	1,000	200	0	0	0	0	0
Ancillary Facilities	300	0	0	0	0	0	0	0	300
Total	2,900	0	1,000	200	58	140	373	829	300
Cumulative Total									
Leases[d]	14,846	286	0	1,722	3,082	5,456	1,385	2,915	0
Mine (Surface)	10,836	254	0	433	1,137	4,098	1,675	3,239	0
Mine (In-Situ)	5,410	32	0	1,289	2,003	1,498	242	346	0
Plant and Spent Sand Disposal	5,817	192	1,000	3,754	89	782	0	0	0
Ancillary Facilities	2,155(445)	0	0	0	0	0	0	0	2,155
Total	24,218	478	1,000	5,476	3,229	6,378	1,917	3,585	2,155

Note: Figures shown in parentheses are acreages that would be removed (plant sites and roads) for life of project. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of project.

[b]Includes measured, delineated areas of flood plain soils; additional small areas not mappable due to map scale occur throughout the area of influence.

[c]Acreage not determined because locations of facilities are unknown at this time.

[d]Total lease area to be converted that is included in this alternative.

3.B.4 Wildlife

Under partial conversion, the extraction of tar sand would collectively disturb 5,000 acres during any one year (Table 2-1) and a total of 21,318 acres over the life of the projects. Partial conversion would disturb only 5 percent of the main block's wildlife habitat during any 1 year, but because preconstruction forage production may not be attained for 20 years or more, this alternative could disturb 22 percent of the main block's wildlife habitat. Applicant and interrelated projects would cumulatively disturb 5,550 acres during any one year for the first 25 years of the project and 5,000 acres during any one year for the next 24 years. These disturbances could involve 7 and 6 percent, respectively, of the main block's wildlife habitat. An estimated 24,218 acres (25 percent) of the main block's wildlife habitat would be disturbed over the entire project life. The effects of these disturbances would be similar to those discussed for the proposed actions (Section 3.A.4, Wildlife) but would not be as severe.

The habitat disturbances would occur progressively over the 49 years, as shown in Figure 2-1. The acres disturbed at any one time would gradually increase until steady-state, full production is achieved. For the next 25 years, 5,000 acres would be collectively disturbed at any one time.

Cumulative acres disturbed at one time would be the same as collective, except that the number of disturbed acres would increase a little faster and peak out at 5,550 for 2 to 3 years and would then return to 5,000 for the remainder of the project life.

3.B.5 Recreation Resources

Adverse impacts to recreation resources and a diminishing quality in dispersed recreation experiences under partial conversion would result largely from a change in recreation access, a reduction in the recreation land base, and an increase in recreation use due to project-induced population growth.

Over the 49-year project life of the partial conversion alternative, 21,318 acres would be disturbed. At any one time during full commercial operation, 5,000 acres would be eliminated from dispersed recreation opportunities such as sightseeing, hunting, camping, and off-road vehicle use. Interrelated projects and partial conversion would cumulatively disturb 24,218 acres over the project's life. Cumulative and collective impacts to dispersed recreation opportunities would be similar, but cumulative impacts would be slightly greater. Because no tar sand would be developed in the Right Fork of Grassy Trail Creek watershed, Whitmore Canyon, the upper reaches of Range Creek, or the Bruin Point area, impacts to recreation access would be minimized, especially along the road/jeep trail from Sunnyside northward to Bruin Point. Sightseeing, hunting, camping, and off-road vehicle use in these favorite recreation areas would be protected. Fishing opportunities and the quality of trout fishing along the upper reaches of Range Creek would be maintained because tar sand would not be developed and sediment would not increase in this area.

Project-related population growth would increase user conflicts, poaching, and other game law violations affecting hunting quality and would cause a shifting from semi-primitive to semi-urban recreation experiences. Impacts would be similar to those described for the proposed actions (Section 3.A.5, Recreation Resources).

Impacts to hiking and backpacking opportunities and quality of user experiences would be slight because of small acreages that would be disturbed at any one time and because of the size of the area to be converted.

The 193 miles of the Green River from Range Creek upstream to the Yampa River have been identified as having national significance and as a potential candidate for wild and scenic river status in the Nationwide Rivers Inventory (NPS 1983).

Pump houses, access roads, and other water development facilities could jeopordize any potential for wild and scenic river designation along portions of the Green River. At best, portions of the Green River would not be classified as "wild" but could be classified as "scenic" or "recreational" under the Wild and Scenic Rivers Act. Pump houses and access roads could also severely diminish the quality of river running in this area by being incompatible with stretches of the Green River.

3.B.6 Visual Resources

Partial conversion would not involve portions of those leases proposed for conversion that could be viewed from the valley lands to the west and south of the conversion area or other lease areas not directly viewed from the valley. As a result, visual resource impacts under this alternative would be considered adverse but not highly significant as defined in Section 3.A.6, Visual Resources, and further explained in Appendix A-9, Visual Resource Management Methodology. These visual contrasts would be viewed from within the STSA or the Nine Mile Creek area to the north. Activity related to the collective development of the conversion areas would significantly change 9,716 VRM Class II acres, 3,568 Class III acres, and 4,827 Class IV acres. The impacts of disturbing 1,855 acres at unknown locations for ancillary facilities cannot be determined. Interrelated projects and conversion-related activity would cumulatively and significantly change 11,116 Class II acres, 3,568 Class III acres, and 6,027 Class IV acres. The impacts to 2,155 acres cannot be determined. See Table 3-33 for a more detailed summary of visual resource impacts.

Surface mining would create visual contrasts between the existing landscape and the resulting landform, which would be present during or following mining. In most conversion areas contrasts would be created between existing vegetation types and patterns and those that would result from surface mining and in-situ extraction. Changes in areas to be used for spent sand disposal would be most evident because of the contrast in landform. Vegetation contrasts would be created in varying degrees, depending on the rate of revegetation and how the areas would be viewed. The plantsite would create significant impacts by imposing a contrasting structure on the existing landscape as seen from valley viewpoints.

TABLE 3-33
SUMMARY OF VISUAL RESOURCE EXISTING CONDITIONS AND SIGNIFICANT IMPACTS (ACRES)
(Partial Conversion Alternative)

	VRM Class II[a]		VRM Class III[a]		VRM Class IV[a]		
Component	Existing[b]	Significantly Affected[c]	Existing[b]	Significantly Affected[c]	Existing[b]	Significantly Affected[c]	Undetermined[d]
Mines	8,796	8,796	320	320	320	320	0
Plants	920	920	3,248	3,248	1,504	152	0
Spent Sand Disposal Areas	—	—	—	—	4,355	4,355	0
Ancillary Facilities	—	—	—	—	—	—	1,855
Total Collective Impacts	9,716	9,716	3,568	3,568	6,179	4,827	1,855
Interrelated Impacts	1,400	1,400	—	—	1,200	1,200	300
Total Cumulative Impacts	11,116	11,116	3,568	3,568	7,379	6,027	2,155

[a]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[b]Acres of existing VRM class in conversion areas included in the partial conversion alternative.

[c]Acres that would be significantly affected as defined in Section 3.A.6, Impact Significance Criteria.

[d]Indicates the acreages that would be required for ancillary facilities whose specific locations and impacts are unknown at this time.

3.B.7 Air Quality

Table 3-34 lists the partial conversion alternative collective and cumulative pollutant concentration values compared to the secondary National Ambient Air Quality Standards (NAAQS) and year 2005 estimated background levels at the receptors showing highest concentrations. The greatest values would be the same for the collective cumulative analyses, but the distribution of pollutants would slightly change.

The total suspended particulate (TSP) levels shown in Map 3-8 are expected to exceed NAAQS due to the surface mining associated with the 75,000 barrels per day (bpd) processing plant. No known fugitive dust control measures could fully mitigate the TSP impacts.

Prevention of Significant Deterioration (PSD) Class II increments are expected to be exceeded for TSP and for sulfur dioxide (SO_2) in a small area of elevated terrain as in both the collective and cumulative analyses. SO_2 impacts shown in Map 3-9 would result mainly from stack gas emissions. The stack gas impact is on elevated terrain near the projected facility. Placing the plant farther from high terrain or increasing the assumed stack height would significantly reduce impacts.

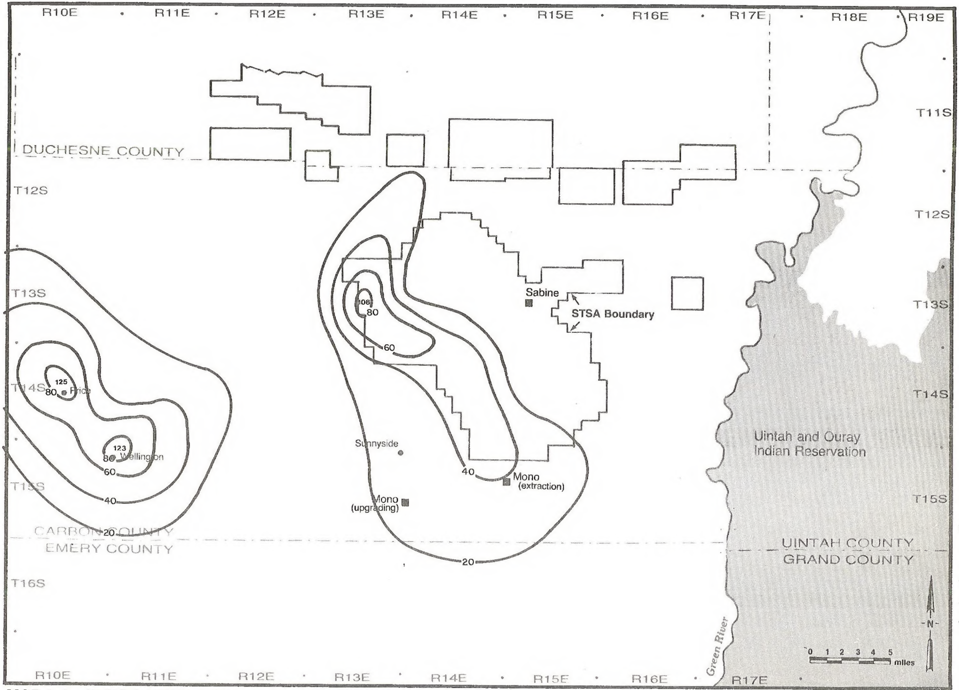
Nitrogen dioxide (NO_2) levels shown in Map 3-10 would be above the NAAQS, again due mostly to stack gas emissions. Visibility impacts would be essentially the same for both the collective and cumulative analyses.

Table 3-35 summarizes the level 2 visibility screening results for the cumulative analysis. Visibility would not be impaired at Arches National Park, Capitol Reef National Park, Canyonlands National Park, or Dinosaur National Monument. The Uintah and Ouray Indian Reservation, however, could experience visual impacts resulting from NO_x emissions in that the plume might be perceptible against the sky or a light background.

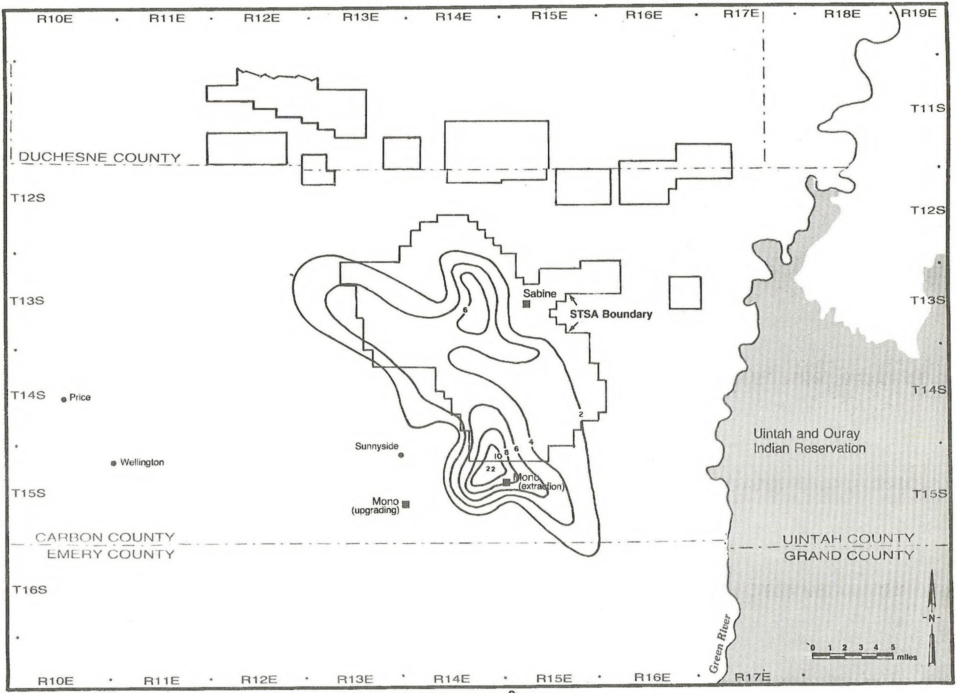
TABLE 3-34
MAXIMUM SO_2, TSP, AND NO_2 CONCENTRATIONS
(Partial Conversion Alternative)

	Maximum Average Concentrations ($\mu g/m^3$)					
	SO_2			TSP		NO_2
Areas of Special Concern	**3-hour**	**24-hour**	**Annual**	**24-hour**	**Annual**	**Annual**
NAAQS	1300	365	80	150	60	100
Class II Areas						
PSD Class II Increment	512	91	20	37	19	NA
Areas Near Sunnyside STSA						
Collective Impacts	1044(18)	290(7)	22(1)	753(62)	171(19)	174(2)
Cumulative Impacts	1044(18)	290(7)	22(1)	753(62)	171(19)	175(2)
Unintah and Ouray Indian Reservation						
Collective Impacts	9(18)	3(7)	<1(1)	<1(62)	<1(19)	2(2)
Cumulative Impacts	11(18)	3(7)	<1(1)	<1(148)	<1(40)	2(2)

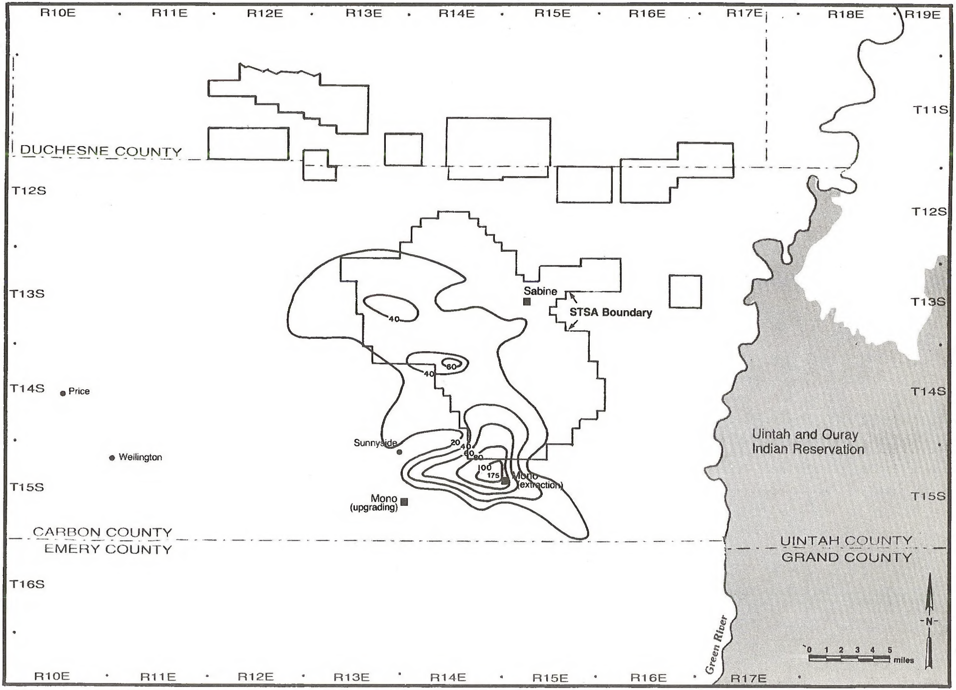
Note: Selection of a different grid origin could result in slightly different maximum concentrations and locations of those maximum due to the terrain variability.
Figures in parentheses represent 2005 Baseline Source Concentrations.



MAP 3-8 CUMULATIVE ANNUAL TSP CONCENTRATIONS (ug/m^3)
(Partial Conversion Alternative)



MAP 3-9 CUMULATIVE ANNUAL SO_2 CONCENTRATIONS (ug/m^3)
(Partial Conversion Alternative)



MAP 3-10 CUMULATIVE ANNUAL NO_2 CONCENTRATIONS (ug/m^3)
(Partial Conversion Alternative)

TABLE 3-35
LEVEL 2 VISIBILITY ANALYSIS
(Partial Conversion Alternative)

Observer Point Location	Contrast Reduction	Visual Range Reduction	Blue-Red Ratio
Panorama Point Arches National Park	0.029	2.7	0.96
Cathedral Valley Overlook Capitol Reef National Park	0.025	2.4	0.99
Murray Point Overlook Canyonlands National Park	0.027	2.5	0.99
Moonshine Rapids Dinosaur National Monument	0.021	1.9	0.96
Buck Knoll Uintah and Ouray Indian Reservation	0.064	6.5	0.77
Peters Point Uintah and Ouray Indian Reservation	0.025	2.4	0.76
EPA Recommended Guidelines	0.100	11.0	0.90

Note: Results presented are for the conversion-related tar sand development plus the interrelated projects.
The recommended criteria has to be exceeded for impacts to contrast and visual range reduction. Visual impacts occur for blue-red ratios less than 0.9.

3.B.8 Transportation Networks

Project-related traffic volume increases would collectively generate significant transportation-related impacts (reducing the level-of-service below C) in 1989 during the peak construction-operation overlap period and in 2003 during the peak operation year. Cumulatively, traffic volume increases would generate significant impacts during the same years. Both collectively and cumulatively, the significant impacts would occur along US 6 between the SR 123 junction and the town of Helper, along SR 123 between the US 6 junction and Sunnyside, and along SR 10 between Price and Castle Dale.

Significant road maintenance problems would occur because traffic volume would increase without a change in the level-of-service.

The increase of project-related rail tonnage over the 5 million gross ton capacity of the spur would generate significant collective and cumulative impacts to the Denver and Rio Grande Western (D&RGW) rail spur from Mounds to Sunnyside because tonnage would exceed the spur's 5 million gross ton capacity. The collective impacts would start in 1989, with the peak operation year being 2003. The cumulative impacts would start in 1989, and peak operation would start in 1995 and continue for the life of the interrelated projects.

Because some of the loaded trucks used during construction and operation could weigh from 90,000 to 200,000 pounds and range from 25 to 102 feet long, new roads might need to be built or existing roads realigned or upgraded. Such construction would have significant collective impacts on visual resources and would cause land disturbance. Because road construction would have to begin 2 years before plant construction, these impacts would begin in 1986.

ROADWAY SYSTEM

Peak years for collective and cumulative construction and operation periods were selected for evaluating impacts. Capacity analyses were completed for annual average monthly traffic and monthly average daily traffic. The monthly average daily traffic relates to June peak traffic demand conditions.

Partial conversion would create a maximum peak demand condition in the project area that would collectively reduce the level of service below C on 6 of 16 road segments for the peak year of 1989 and on 8 of 16 road segments for the peak year of 2003. Partial conversion and interrelated projects would cumulatively create a maximum peak demand condition that would reduce level of service below C on 8 of 16 road segments in 1989 and on 11 of 16 road segments in 2003.

This analysis is based on service volumes for level-of-service C and computed from standards from the American Association of State Highways and Transportation Officials, and which are used by the Utah Department of Transportation (UDOT) as a design standard for rural minor arterial and major collectors.

According to the UDOT, 1982 traffic and the road facilities serving the project area are in a stable flow condition. But project traffic for partial conversion would downgrade the level-of-service on most road segments in the project area. Table 3-36 shows projected baseline estimates, vehicle trips per day (VTPD), total peak vehicle trips per day, percentage increase in project baseline, and level-of-service for collective and cumulative construction-operation overlap years and operation years. Table 3-36 also lists 16 roadway segments (on US 6 between Green River and Helper, on SR 123 between US 6 junction and Sunnyside, and on SR 10 between Price and Castle Dale) and defines those segments that would be affected.

Partial conversion would collectively increase vehicle trips per day (VTPD) by 6,080 for the peak year of 1989. This traffic increase would have the short-term impact of reducing the level-of-service below C. During the peak year 2003, VTPD would increase by 8,030, reducing the level-of-service below C, a preferred maximum traffic volume for rural minor arterial and collector roadways. Table 3-36 shows six road segments in 1989 and eight in 2003 where the level-of-service would fall below C. Shown on Map 1-3, these segments would have significant traffic volume impacts.

In 2003 the interrelated coal mines and Chevron's interrelated project would add 17,642 VTPD to the roadway system (US 6, SR 10, and SR 123), increase the impacts defined in the collective section, and extend the impacts to roadway segments on SR 10 between Price and Castle Dale. Operation-associated traffic volumes would begin to increase from 1990 (11,330 VTPD) through 2005 (17,002 VTPD) and peak in 2003 (17,672 VTPD). Table 3-36 shows the segments (8 in 1989 and 10 in 2003) that would be significantly affected by the level-of-service falling below C.

The 1982 vehicle accident rate for US 6 between Soldier Summit and Green River was 1.22 accidents per million vehicle miles traveled (MVMT), which is less than the Utah's expected rate of 2.06 accidents per MVMT for this type of road. On SR 123 between the US 6 junction and Sunnyside, the 1982 rate was 0.75 accidents per MVMT, which is less than the 2.88 accidents expected; and on SR 10 between Price and Castle Dale, the 1982 rate was 1.29 accidents per MVMT, which also is less than the expected rate of 2.02. The number of traffic accidents per MVMT in 1982 on US 6 between Soldier Summit and Green River was 166, the number for SR 123 between the US 6 junction and Sunnyside was 6, and the number for SR 10 between Price and Castle Dale was 64. Collectively, in 1989 (the construction-operation overlap period), the conversion-related tar sand development would add 6,080 VTPD to the projected baseline; in 2003 (the operation year) 8,030 VTPD would be added. This increased traffic volume would reduce the level-of-service below level C and increase traffic accidents for road segments shown in Table 3-36. Information from the UDOT Division of Traffic Safety reveals that traffic accident rates would not significantly increase but that traffic accidents would increase in proportion to the increase in traffic volume. Collectively, in 1989 (the construction-operation overlap year), the 75 percent increase in VTPD would cause 60 more traffic accidents; in 2003 (the peak operation year), the 131 percent increase in VTPD would cause about 105 more traffic accidents. This increase in traffic accidents would significantly impair traveler safety.

Partial conversion and interrelated projects would cumulatively add 15,576 VTPD to the baseline in 1989 and 17,642 VTPD to the baseline in 2003. This

TABLE 3-36
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Partial Conversion Alternative)

			COLLECTIVE IMPACTS										
			Construction-Operation Overlap Impacts						Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	Level-of-Service of Projected Baseline[c]	2003 Level-Baseline Service Baseline[c]	Projected 2003 Related Estimate (VTPD)[a]	2003 Applicant Total Increase (VTPD)	Increase Peak VTPD	Percent Service Projected Baseline	Level-of-Projected Baseline[c]
US 6 Junction SR J39	1	C	12,653	425	13,078	3	C	C	14,690	400	15,090	3	C
FAS 298 (old road) 55 West of Price	2	B	8,164	800	8,964	10	C	B	9,478	1,200	10,678	13	C
Bypass Road S of Price	3	B	9,421	3,520	12,942	37	C	B	10,936	4,830	15,766	44	C
West Incl. Wellington	4	B	6,876	3,520	10,397	53	D	C	7,982	4,830	12,812	61	E
East Incl. Wellington	5	B	4,683	4,135	8,816	88	D	B	5,437	5,680	11,117	104	E
Woodside-FAI 70 West of Green River	6	B	2,545	220	2,765	9	B	B	2,994	135	3,129	5	B
SR 123 Junction US 6	7	B	2,718	4,350	7,068	160	C	B	3,155	5,815	8,970	184	D
Junction SR 124	8	C	4,034	5,685	9,719	141	F	C	4,783	7,450	12,233	156	F
South Incl. Sunnyside-North Incl. Sunnyside	9	B	2,015	6,080	8,095	302	D	B	2,338	8,030	10,368	343	E
SR 10 East Incl. Castle Dale	10	C	3,439	180	3,619	5	C	C	3,993	200	4,193	5	C
Junction SR 29	11	D	5,305	180	5,485	3	C	D	6,159	200	6,359	3	D
South Incl. Huntington	12	D	6,860	310	7,150	5	D	D	7,894	340	8,234	4	E
Junction SR 155 Road to Elmo	13	C	3,883	450	4,333	12	C	C	4,508	480	4,988	11	C
Carbon/Emery County Line	14	C	3,883	460	4,343	12	C	C	4,508	500	5,008	11	C
Junction SR 122	15	C	4,034	485	4,519	12	C	C	4,684	530	5,214	11	C
Price South Incl. Price	16	D	6,712	500	7,212	7	D	D	7,759	550	8,309	7	E

TABLE 3-36 (Concluded)
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Partial Conversion Alternative)

			CUMULATIVE IMPACTS										
			Construction-Operation Overlap Impacts						Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	Level-of-Service of-Projected Baseline[c]	2003 Level-Baseline Service Baseline[c]	Projected 2003 Related Estimate (VTPD)[a]	2003 Applicant Total Increase (VTPD)	Increase Peak VTPD	Percent Service Projected Baseline	Level-of-Projected Baseline[c]
US 6 Junction SR J39	1	C	12,653	1,325	13,978	10	C	C	14,690	1,180	15,870	8	C
FAS 298 (old road) SR 55 West of Price	2	B	8,164	2,800	10,964	34	C	B	9,478	3,455	12,933	36	C
Bypass Road S of Price	3	B	9,421	12,170	21,591	129	D	B	10,936	12,110	23,046	111	E
West Incl. Wellington	4	B	6,876	6,780	13,656	99	E	C	7,982	8,280	16,262	104	F
East Incl. Wellington	5	B	4,683	5,195	9,878	111	D	B	5,437	7,580	13,017	139	E
Woodside-FAI 70 West of Green River	6	B	2,545	275	2,820	11	B	B	2,994	180	3,174	6	B
SR 123 Junction US 6	7	B	2,718	2,620	8,338	207	D	B	3,155	6,630	9,785	210	D
Junction SR 124	8	C	4,034	5,940	9,972	147	F	C	4,383	8,070	12,853	169	F
South Incl. Sunnyside-North Incl. Sunnyside	9	B	2,015	6,335	8,350	314	D	B	2,338	8,645	10,983	370	E
SR 10 East Incl. Castle Dale	10	C	3,439	865	4,299	25	C	C	3,993	1,035	5,028	26	C
Junction SR 29	11	D	5,305	865	6,170	16	C	D	6,159	1,035	7,194	17	D
South Incl. Huntington	12	D	6,860	1,220	8,080	18	D	D	7,894	1,455	9,349	18	E
Junction SR 155 Road to Elmo	13	C	3,883	1,680	5,563	43	C	C	4,508	2,010	6,518	45	D
Carbon/Emery County Line	14	C	3,883	1,700	5,583	44	C	C	4,508	2,070	6,578	46	C
Junction SR 122	15	C	4,034	1,740	5,774	43	C	C	4,684	2,120	6,804	45	D
Price South Incl. Price	16	D	6,712	1,770	8,482	46	E	D	7,759	2,150	9,901	28	E

Note: VTPD = vehicle trips per day; Incl. = including.

[a]Refers to locations shown on Map 1-3.

[b]Projected 1981 highway traffic volume for US 6, SR 123 and SR 10 by one percent compounded.

[c]American Association State Highway and Transportation (1965) Levels-of-Service. A=free traffic flow, accompanied by low volumes and high speeds; B=stable traffic flow, with operating speeds beginning to be restricted by traffic conditions; C=stable traffic flow, but drivers are restricted in their freedom to select speed, change lanes, or pass; D=approaches unstable traffic flow, with fluctuations in volume and temporary restrictions to flow, which may cause substantial drops in operating speeds; E=unstable traffic flow, with momentary stoppages; F=forced traffic flow, with low speeds and short or long stoppages because of downstream congestion. Level-of-Service = Baseline x factor (Volume Per Hour) - factor (Volume Capacity Ratio and calculated on a highway speed of 60 mph under uninterrupted flow conditions).

increased traffic would reduce the level-of-service below C and increase traffic accidents for segments of the road system as shown on Table 3-36. The segments that would be most affected cumulatively would be on SR 10 between Price and Castle Dale. UDOT reported that the traffic accident rate would not significantly increase but that traffic accidents would increase in proportion to the increase in traffic volume. Cumulatively, in 1989, the 349 percent increase in VTPD would cause about 279 more traffic accidents; in 2003, the 408 percent increase would cause 326 more traffic accidents.

Some of the loaded trucks used during construction and operation could weigh from 90,000 to 200,000 pounds and could range from 25 to 102 feet long. As a result, new roads would need to be built, and all roads used by the applicants within the STSA would need to be realigned or upgraded. The large and heavy trucks would mostly use the roads in the STSA, but if they need to use public roads, the proper special use permits would have to be obtained from UDOT.

RAIL SYSTEM

Collectively, the material and equipment needed to build the two processing plants would not exceed the 5-million-gross-ton capacity of the D&RGW spur between Mound and Sunnyside. The processing plants would be built from modules that would be shipped to the East Carbon/Sunnyside railhead and trucked to the plantsites. The size of these modules could generate oversize loads that would require special handling by the D&RGW and have significant impacts.

Collectively, the two processing plants would produce 80,000 bpd of synfuel during peak operation. The synfuel could be carried from the plants via truck, rail, pipeline or a combination of these. In a worst-case estimate, about half (40,000 bpd or 2.2 million gross tons per year) could be shipped by rail from Sunnyside. The collective tonnage would be close to the established 5 million-gross-tons-per-year capacity of the D&RGW spur and would be close to a significant collective impact to the rail spur. To transport this amount of oil, 73, 85-ton railroad tank cars would have to be loaded each day, amounting to one 84-car unit train per day in and out of the East Carbon-Sunnyside area. Finding enough space to build speed loading facilities and a rail car storage yard for two 84-unit trains or 168 tank cars could be difficult.

Assuming that the remaining 40,000 bpd would be hauled by truck would be impractical because this much oil would require 210 trucks per day carrying 8,000 gallons per truck and weighing 30 tons each. Therefore, the analysis assumed that the remaining oil would be carried by pipeline, which would not significantly affect existing transportation networks.

As production approaches the full commercial level of 80,000 bpd, the synfuel could be more cheaply carried by pipeline, a suggestion of the applicants.

The interrelated projects would significantly but temporarily affect the Sunnyside D&RGW spur during construction (1987 to 1989) by requiring the shipping of material and equipment that would exceed 3 million gross tons per year. During operation, the total rail tonnage for the coal mines would amount to 7.2 million gross tons per year by 1995. This tonnage would exceed the rail spur's estimated 5 million gross tons-per-year capacity and would have a significant long-term impact. The cumulative tonnage would also increase the congestion at the rail storage yard in the East Carbon-Sunnyside area.

PUBLIC TRANSPORTATION

Projected population increases (40,600 in 1989 and 57,400 in 2005) could significantly benefit public transportation by enabling the Price and Green River airports to support commercial flights.

Neither the collective nor cumulative population increases would significantly affect passenger rail or bus service, but population increases could provide the impetus to establish bus service on SR 10 to Huntington, Cleveland, Elmo, Orangeville, and Castle Dale and on SR 123 to East Carbon and Sunnyside.

3.B.9 Agriculture

GRAZING

The partial conversion alternative would collectively disturb enough land to cause a 279-AUM annual loss of forage and cause an annual reduction of 69 head of cattle for the 4-month grazing season. Cumulatively, 301 AUMs of forage would be lost per year, and cattle grazing would be reduced by 75 head. See Table 3-37 for number of operators and allotments that would be affected, the potential AUMs lost by allotment, and the percentage of each allotment that

TABLE 3-37
GRAZING ALLOTMENTS AFFECTED AND GRAZING LOSSES CAUSED BY THE PARTIAL CONVERSION ALTERNATIVE

	CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMs)[a]			
Allotment Name and Number	Number of Operators	Acreage Public	Acreage Total	Active Reference (AUMs)	Collective Total	Interrelated Projects Total	Cumulative Total	Percent of Allotment
Cow Canyon (4032)	4	2,145	—	71 (30 Ac/AUM)	46 (5)	0 0	46 (5)	64 (7)
Dry Canyon (4038)	1	14,815	20,680	890 (17 Ac/AUM)	226 (58)	0 0	226 (58)	25 (6)
Green River North (4049)	1	122,845	166,621	8,584 (14 Ac/AUM)	436 (84)	0 0	436 (84)	5 (1)
Mud Springs (4077)	1	21,836	27,859	2,320 (9 Ac/AUM)	483 (87)	0 0	483 (87)	21 (4)
Sheep Canyon (4103)	7	9,170	18,302	696 (13 Ac/AUM)	277 (32)	0 0	277 (32)	40 (4)
Stone Cabin (4109)	2	23,014	30,518	1,625 (14 Ac/AUM)	64 (12)	0 0	64 (12)	4 (1)
Outside[b]	2	—	NA	NA (16 Ac/AUM)	10 (1)	112 (22)	122 (23)	NA NA
Total AUMs Lost/Year					(279)	(22)	(301)	

Note: AUM = animal unit month; Ac/AUM = acres per animal unit month; NA = not applicable.

[a]Figures without parentheses represent forage production (AUMs) per year for the entire proposed conversion area or area affected. Figures enclosed by parentheses represent average forage production (AUMs) lost per year due to mining activities based on a 5-year reclamation schedule (with exception of Amoco)

[b]Grazing parcels outside of named allotment boundaries.

would be affected. Grazing disturbances would affect 16 ranch operators on six allotments over a 74-year period.

Partial conversion, however, would reduce impacts to grazing by excluding mining from 12,250 acres of grazing land and from areas around critical water sources for key livestock grazing areas. See Map 1-5 (map pocket of draft EIS) for areas that would be excluded from mining. Excluding 2,120 acres of grazing land from mining within Dry Canyon allotment would also reduce the impact to the one operation to the point that it might continue to exist. Excluding 1,280 acres of grazing land from mining in Sheep Canyon allotment would lessen impacts to another operator. Protecting some of the main livestock waters would also lessen grazing impacts within Green River North, Sheep Canyon, and Dry Canyon allotments.

See the discussion of the proposed actions (Section 3.A.9, Agriculture) for an explanation of the grazing impacts that would result from surface mining, spent sand disposal, and in-situ recovery. Map 3-2 shows the locations of grazing allotments.

CROPLAND

Although the STSA has no cropland, cropland losses are expected due to population expansion (Section 3.A.9, Agriculture). Project-related population increases would result in the conversion of 2,117 acres to homesites and other related support facilities around Price, Wellington, and Sunnyside. About 700 acres of cropland would be converted to urban uses, but this conversion would be insignificant.

3.B.10 Cultural Resources

Partial conversion would affect cultural resources much as would the proposed actions (Section 3.A.10, Cultural Resources) although fewer cultural resources might be affected because partial conversion would disturb fewer acres. The cumulative adverse impacts of tar sand development on historic and prehistoric resources would be of the same type but greater than the collective impacts because of the 2,900 more acres disturbed and the greater population increase involved.

3.B.11 Paleontology and Mineral Resources

The partial conversion alternative would collectively and cumulatively remove 1.1 and 1.3 billion barrels of bitumen or 31 and 37 percent, respectively, of the tar sand resource estimated to occur in the STSA.

Partial conversion would have the same impacts on paleontological resources as those described for the proposed action (Section 3.A.11, Paleontology and Mineral Resources).

3.B.12 Wilderness Resources

Partial conversion would not significantly affect Turtle Canyon, Desolation Canyon, and Jack Canyon wilderness study areas (WSAs) because none of the lease conversion areas included in this alternative would overlie these units.

Secondary impacts to the wilderness resource of the three WSAs and to the quality of wilderness user experiences would be the same type as analyzed for the proposed actions (Section 3.A.12, Wilderness Resources) but would be smaller. Because the upper reaches of Range Creek would not be developed, fishing opportunities and the quality of fishing experiences would not be affected along Range Creek in Turtle Canyon or Desolation Canyon WSAs.

Although plumes from processing plants could be seen against the sky or light background due to nitrous oxide emissions, they would only slightly degrade wilderness values in Turtle Canyon, Desolation Canyon, and Jack Canyon WSAs.

Increased visitors to these WSAs would have impacts similar to those of the proposed actions (Section 3.B.12, Wilderness Resources) due to a similar project-induced population growth rate. Cumulative population increases due to partial conversion and interrelated projects could degrade the quality of the wilderness experience, especially solitude and naturalness in Turtle Canyon, Desolation Canyon, and Jack Canyon WSAs.

3.B.13 Conflicts with Land Use Plans, Policies, and Constraints

A predicted 1,280 acres of special watershed management areas would require a special management decision to avoid potential conflicts. Proposals to develop areas around Bruin Point could conflict with a BLM management framework plan and Title V Section 501 (a)(5) of the Federal Land Policy and Management Act if the applicants restrict the use of Bruin Point as a communication equipment location. Partial conversion could also conflict with the land use plans of Carbon County, the towns of Sunnyside and East Carbon, and BLM. Specific conflicts, however, cannot now be identified because project designs are not well enough developed. Both collectively and cumulatively, nonconformance with such plans could be resolved by amending them to eliminate conflicts.

3.C Unitized Development Alternative

Under the unitized development alternative, all the lease tracts proposed for conversion would be approved, but only one 50,000 bpd tar sand processing plant (centrally located near Sunnyside) would be built and operated in association with the conversion areas. This analysis assumed that the conversion areas would support a 50,000 bpd industry for 94 years. See Section 1.E, Unitized Development Alternative, for more details on this alternative.

Unitized development would permit tar sand to be developed in a slow, orderly fashion, which could assure more time to monitor changes and develop mitigation. The slow rate of development could also allow more time for surveys to determine the critical resources present.

3.C.1 Water Resources

Unitized development would have the same types of impacts to the individual watersheds as would the proposed actions. Because fewer acres would be disturbed at any one time, however, the degree of impact on any watershed component would be somewhat less. Using less water than the other alternatives due to a slower rate of production, unitized development could still deplete water in either the Price River or the Green River or both. Table 3-38 shows changes in water flow and quality. As a result of tar sand development, 18,840 acre-feet per year could be withdrawn from surface waters.

TABLE 3-38
CHANGES IN WATER FLOW AND QUALITY
(Unitized Development Alternative)

	Price River		Green River	
Parameter	**Collective**	**Cumulative**	**Collective**	**Cumulative**
Annual water use[a] (ac-ft)	14,340	18,840	14,340	18,840
Percent reduction in flow	19%	25%	<1%	<1%
TDS change	little or no change	little or no change	<1 mg/l	<1 mg/l

Note: ac-ft = acre-feet; mg/l = milligrams per liter; TDS = total dissolved solids.
[a]Total water use as measured at Green River, Utah, would be 18,840 ac-ft/yr.

3.C.2 Socioeconomics

This analysis is based on the Socioeconomic Technical Report: Sunnyside Special Tar Sands Area Development Analysis (Argonne National Laboratory 1984). The technical report also gives detailed data on historical and current socioeconomic conditions in the area of influence and assumptions for the baseline projections and interrelated projects. The area of influence and work force assumptions for the interrelated projects are given in Appendix A-6, Socioeconomics.

POPULATION AND EMPLOYMENT

Historical and current population and employment trends and the projected effects of the interrelated projects are described in Section 3.A, Proposed Actions.

Under unitized development, the applicants' (including Chevron's project on private land) permanent operation work force would peak in 2003 at 2,465 (Table 1-13, Section 1.H). Because buildup of the operation work force would occur at the same time as construction and the construction work force would be relatively small, a separate construction employment peak would not occur. The tar sand development assumed under unitized development would cause a population increase of 12,140 by 2005 (Table 3-39). The cumulative (including interrelated projects) population increase would amount to 31,300 in 2005. These population increases represent growth exceeding the 2005 baseline for the area of influence by 23 and 60 percent, respectively.

Carbon County's population growth would be greater than Emery County's. By 2005, Carbon County's poulation would increase by 30 percent over baseline as a result of applicant projects, and applicant and interrelated projects would cause a cumulative population increase of 78 percent.

Price would experience the greatest community population growth, but the populations of

TABLE 3-39
POPULATION IMPACTS
(Unitized Development Alternative)

	1980	2005	1980	2005
	Total Area of Influence		Carbon County	
Baseline Population	33,630	51,830	22,179	37,280
Applicants' Collective Impacts		12,140		11,070
Percent Increase Over Baseline		23		30
Interrelated Projects		19,160		18,190
Cumulative Impacts		31,300		29,260
Percent Increase Over Baseline		60		78
Total Population	33,630	83,130	22,179	66,540
	East Carbon		Sunnyside	
Baseline Population	1,942	995	611	315
Applicants' Collective Impacts		2,460		860
Percent Increase Over Baseline		247		273
Interrelated Projects		1,140		400
Cumulative Impacts		3,600		1,260
Percent Increase Over Baseline		362		400
Total Population	1,942	4,595	611	1,575
	Helper		Unincorporated Areas of Helper CCD	
Baseline Population	2,724	4,100	1,729	2,660
Applicants' Collective Impacts		350		60
Percent Increase Over Baseline		9		2
Interrelated Projects		1,100		730
Cumulative Impacts		1,450		790
Percent Increase Over Baseline		35		30
Total Population	2,724	5,550	1,729	3,450
	Price		Wellington	
Baseline Population	9,086	18,500	1,406	2,800
Applicants' Collective Impacts		4,650		1,290
Percent Increase Over Baseline		25		46
Interrelated Projects		9,630		2,670

TABLE 3-39 (Continued)
POPULATION IMPACTS
(Unitized Development Alternative)

	1980	2005	1980	2005
Cumulative Impacts		14,280		3,960
Percent Increase Over Baseline		77		141
Total Population	9,086	32,780	1,406	6,760
	Unincorporated Areas of Price CCD		Emery County[a]	
Baseline Population	4,327	7,500	11,451	14,550
Applicants' Collective Impacts		1,220		1,070
Percent Increase Over Baseline		16		7
Interrelated Projects		2,520		970
Cumulative Impacts		3,740		2,040
Percent Increase Over Baseline		50		14
Total Population	4,327	11,240	11,451	16,590
	Castle Dale		Cleveland	
Baseline Population	1,910	2,850	522	600
Applicants' Collective Impacts		290		50
Percent Increase Over Baseline		10		8
Interrelated Projects		270		40
Cumulative Impacts		560		90
Percent Increase Over Baseline		20		15
Total Population	1,910	3,410	522	690
	Elmo		Huntington	
Baseline Population	300	360	2,316	2,850
Applicants' Collective Impacts		30		210
Percent Increase Over Baseline		8		7
Interrelated Projects		30		200
Cumulative Impacts		60		410
Percent Increase Over Baseline		17		14
Total Population	300	420	2,316	3,260

TABLE 3-39 (Concluded)
POPULATION IMPACTS
(Unitized Development Alternative)

	1980	2005	1980	2005
	Orangeville		Unincorporated Areas of Castle Dale-Huntington CCD	
Baseline Population	1,309	1,970	1,489	1,570
Applicants' Collective Impacts		210		40
Percent Increase Over Baseline		11		3
Interrelated Projects		200		40
Cumulative Impacts		410		80
Percent Increase Over Baseline		21		5
Total Population	1,309	2,380	1,489	1,650
	Green River		Unincorporated areas of Green River CCD	
Baseline Population	956	1,000	166	170
Applicants' Collective Impacts		190		30
Percent Increase Over Baseline		19		18
Interrelated Projects		60		10
Cumulative Impacts		250		40
Percent Increase Over Baseline		25		24
Total Population	956	1,250	166	210

Note: CCD = Census County Division.
No construction employment peak would occur under unitized development (see Section 3.C.2).
[a]Includes insignificant impacts to the Emery-Ferron CCD.

Sunnyside, East Carbon, and Wellington would grow most relative to baseline. By 2005, populations would increase by 273 percent (applicant) and 400 percent (cumulative) in Sunnyside, by 247 percent (applicant) and 362 percent (cumulative) in East Carbon, and by 46 percent (applicant) and 141 percent (cumulative) in Wellington. Under a significance criterion of a 5 percent or more increase over the baseline, the populations of both counties and all communities in the area of influence would significantly grow under unitized development. Population would also significantly grow in unincorporated parts of Carbon County. As a result of applicant projects, the unincorporated population of the Price CCD would increase by 16 percent over baseline in 2005. As a result of applicant and interrelated projects, this area's population would increase by 50 percent over baseline in 2005.

Table 3-40 presents employment data for the affected counties. (Employment statistics do not exist for community level analysis.) For the area of influence, total employment in 2005 is expected to increase by 22 percent over the baseline as a result of the applicants' proposals and by 57 percent as a result of applicant and interrelated projects.

Carbon County would have the greater increase in employment. By 2005, Carbon County's employment would increase by 30 percent over the baseline due to applicant projects and would increase by 75 percent over baseline due to applicant and interrelated projects. Applicant projects would insignificantly increase Emery County's employment, but applicant and interrelated projects would cause employment to rise to 14 percent. Therefore, both counties would incur significant cumulative impacts, but only Carbon County would be significantly affected by applicant projects alone.

PERSONAL INCOME

Because existing mining has already given the area of influence a relatively high per capita personal income (PCPI), unitized development would not significantly increase the area's PCPI over the level projected for the baseline from applicant projects during either construction or operation. When the interrelated projects are added, however, the increase would be significant. By 2005, applicant and interrelated projects together would increase PCPI by 6 percent to an estimated $13,351, as compared to the baseline projection of $12,602 (both in 1980 dollars).

In 2005, 91 percent of total personal income increases resulting from applicant projects would occur in Carbon County, and 94 percent of the total personal increases resulting from applicant and interrelated projects would cumulatively occur in Carbon County.

The $457 million (1980 dollars) increase in personal income for the area of influence in 2005 is likely to significantly raise the cost of housing and of consumer goods and services. Significant local price inflation could result from local increased purchasing power, which would harm those with fixed incomes like the elderly and those who lack the skills to be employable in the higher income occupations.

HOUSING

Unitized development would test the ability of the affected communities to provide adequate and affordable housing. Table 3-41 shows the increased demand for housing that would result from applicant projects, from interrelated projects, and from both. The 1980 column shows the total housing supply in that year. For the socioeconomic area of influence in 2005, applicant projects would increase demand for housing by 21 percent over baseline, and applicant and interrelated projects would increase housing demand by 57 percent. Carbon County would experience most of the housing demand increases. Price would experience the greatest absolute housing demand increases of the communities in the area of influence. Sunnyside, East Carbon, and Wellington, however, would experience the greatest housing demand increases compared to baseline. Under a significance criterion of 5 percent over baseline, all communities would be significantly affected. Increased housing demand would benefit the housing construction and finance industries, but a limited housing supply would likely contribute to land speculation and increased housing costs in all of the significantly affected communities, except possibly for Cleveland, Elmo, and Green River, which seem to have an adequate housing supply.

LOCAL GOVERNMENT SERVICES AND FACILITIES

These assessments of local government services and facilities are based on estimates derived from the Socioeconomic Technical Report (Argonne National Laboratory 1984). The method used to derive the estimates is described in Appendix A-6, Socioeconomics.

TABLE 3-40
EMPLOYMENT IMPACTS
(Unitized Development Alternative)

	1980	2005	1980	2005
	Total Area of Influence		Carbon County	
Baseline Employment	14,837	22,900	9,385	16,020
Applicants' Collective Impacts		4,930		4,750
Percent Increase Over Baseline		22		30
Interrelated Projects		8,060		7,250
Cumulative Impacts		12,990		12,000
Percent Increase Over Baseline		57		75
Total Employment	14,837	35,890	9,385	28,020
	Emery County			
Baseline Employment	5,452	6,880		
Applicants' Collective Impacts		180		
Percent Increase Over Baseline		3		
Interrelated Projects		810		
Cumulative Impacts		990		
Percent Increase Over Baseline		14		
Total Employment	5,452	7,870		

Note: No construction employment peak would occur under unitized development (see Section 3.C.2).

TABLE 3-41
HOUSEHOLD PROJECTIONS
(Unitized Development Alternative)

	1980[a]	2005	1980[a]	2005
	Total Area of Influence		Carbon County	
Baseline Households	11,454	15,670	7,794	11,700
Applicants' Collective Impacts		3,340		3,040
Percent Increase Over Baseline		21		26
Interrelated Projects		5,580		5,300
Cumulative Impacts		8,920		8,340
Percent Increase Over Baseline		57		71
Total Households	11,454	24,590	7,794	20,040
	East Carbon		Sunnyside	
Baseline Households	714	310	206	100
Applicants' Collective Impacts		680		240
Percent Increase Over Baseline		219		240
Interrelated Projects		330		120
Cumulative Impacts		1,010		360
Percent Increase Over Baseline		326		360
Total Households	714	1,320	206	460
	Helper		Unincorporated Areas of Helper CCD	
Baseline Households	1,074	1,280	659	840
Applicants' Collective Impacts		100		60
Percent Increase Over Baseline		8		7
Interrelated Projects		320		210
Cumulative Impacts		420		270
Percent Increase Over Baseline		33		32
Total Households	1,074	1,700	659	1,110
	Price		Wellington	
Baseline Households	3,195	5,790	433	900
Applicants' Collective Impacts		1,280		350
Percent Increase Over Baseline		22		39
Interrelated Projects		2,810		780

TABLE 3-41 (Continued)
HOUSEHOLD PROJECTIONS
(Unitized Development Alternative)

	1980[a]	2005	1980[a]	2005
Cumulative Impacts		4,090		1,130
Percent Increase Over Baseline		71		126
Total Households	3,195	9,880	433	2,030
	Unincorporated Areas of Price CCD		Emery County[b]	
Baseline Households	1,365	2,350	3,660	3,970
Applicants' Collective Impacts		330		300
Percent Increase Over Baseline		14		8
Interrelated Projects		730		280
Cumulative Impacts		1,060		580
Percent Increase Over Baseline		45		15
Total Households	1,365	3,410	3,660	4,550
	Castle Dale		Cleveland	
Baseline Households	622	780	156	160
Applicants' Collective Impacts		80		10
Percent Increase Over Baseline		10		6
Interrelated Projects		80		10
Cumulative Impacts		160		20
Percent Increase Over Baseline		21		12
Total Households	622	940	156	180
	Elmo		Huntington	
Baseline Households	90	100	757	780

TABLE 3-41 (Concluded)
HOUSEHOLD PROJECTIONS
(Unitized Development Alternative)

	1980[a]	2005	1980[a]	2005
Applicants' Collective Impacts		10		60
Percent Increase Over Baseline		10		8
Interrelated Projects		10		55
Cumulative Impacts		20		115
Percent Increase Over Baseline		20		15
Total Households	90	120	757	895
	Orangeville		Unincorporated Areas of Castle Dale-Huntington CCD	
Baseline Households	397	530	414	430
Applicants' Collective Impacts		60		10
Percent Increase Over Baseline		11		2
Interrelated Projects		55		10
Cumulative Impacts		115		20
Percent Increase Over Baseline		22		5
Total Households	397	645	414	450
	Green River		Unincorporated areas of Green River CCD	
Baseline Households	388	270	37	50
Applicants' Collective Impacts		50		10
Percent Increase Over Baseline		19		20
Interrelated Projects		20		5
Cumulative Impacts		70		15
Percent Increase Over Baseline		26		30
Total Households	388	340	37	65

Note: CCD = Census County Division.
No construction employment peak would occur under unitized development (see Section 3.C.2).
[a]Total available stock of year-round housing units.
[b]Includes insignificant impacts to the Emery-Ferron CCD.

Education

Unitized development would require significant increases in teachers and classrooms over baseline in the area of influence. Applicant projects would most severely affect Carbon County, increasing demand by 130 teachers and classrooms (69 percent) by 2005. Applicant and interrelated projects would increase teacher and classroom demand by 350 or 185 percent by 2005. Emery County would need nine more teachers and classrooms (15 percent increase) as a result of applicant projects, and applicant and interrelated projects would increase demand by 21 teachers and classrooms (34 percent) by 2005. Such increases in classrooms would require expanding school systems to about equal this demand because the baseline demand would eliminate all existing capacity in Carbon County and 77 percent of existing capacity in Emery County

Medical Services

All medical services and facilities would be severely affected under unitized development because capacity would be lacking to support the increased demand caused by tar sand development and interrelated projects. Even under the baseline demand, more physicians, dentists, and hospital beds would be needed by 1985. Carbon County would experience the most significant impacts, but Emery County could also be highly affected if it continues to lack services by that time. Under unitized development, the area of influence would have a demand for eight more physicians and seven more dentists (67 percent and 70 percent respectively over baseline demand) by 2005. Forty-seven percent more hospital beds would also be needed in the socioeconomic area of influence by 2005. Applicant and interrelated projects would raise these needs to 19 physicians (158 percent increase), 16 dentists (160 percent increase), and 106 hospital beds (125 percent increase) by 2005.

Social and Mental Health Services

Understaffing and rising case loads now affect social and mental health services in the area of influence, and an estimated 1 more psychologist and 10 more social workers would be needed as a result of baseline growth in the next 10 years (Walker 1983). Increased population caused by the applicant and interrelated projects would create a further need for 1 more psychologist and 21 more social workers by 2005.

Law Enforcement

Demand for law officers and patrol cars would significantly increase over baseline in the area of influence under unitized development. By 2005, applicant projects would collectively increase demand for law officers and patrol cars by 74 percent, and applicant and interrelated projects would cumulatively increase such demand by 190 percent. Emery's County's demands would be 43 and 71 percent, respectively, representing, however, three to five more officers and patrol cars. Jails would also have to be expanded, particularly in Carbon County, whose jail is already overcrowded.

Fire Protection

More fire equipment would likely be needed in the area of influence, but existing data does not allow number estimates. Moreover, at least some communities might no longer be able to rely on volunteer fire departments.

Sewage Disposal

Sewage system capacity figures are not available for several of the communities. Existing figures reveal that the systems in Cleveland and Elmo and the combined Castle Dale-Orangeville system should be adequate for the cumulative population growth projected under unitized development. The system in Huntington, however, would be overloaded by 1989, as would the combined system of East Carbon and Sunnyside by 2005. The combined system of Price, Helper, and Wellington is now operating at over design capacity. Even under a planned expansion to a large enough capacity for a population of 31,500, the system would reach its full capacity by 2005.

Solid Waste Disposal

Impacts to solid waste disposal systems would be similar to but less severe than those discussed for the proposed actions because of a 60 percent population increase in Carbon and Emery Counties

under unitized development as compared to a 87 percent increase under the proposed actions.

Water

Unitized developement would significantly increase demands for water in the area of influence over increases required for baseline growth in both Carbon and Emery counties. Water demand in Carbon County, as measured by the number of water system connections, would increase by 73 percent over baseline by 2005 as a result of applicant projects and by 194 percent as a result of applicant and interrelated projects. In Emery County, the comparable increases would be 34 and 66 percent.

Information on community water systems shows that some have little or no excess capacity in the number of connections. In Carbon County, the Price water treatment plant's design capacity is considered well under peak demand, and the East Carbon and Sunnyside system obtains its water from the Grassy Trail Creek watershed, which would be affected by mining. Scofield Reservoir, the sole source of water for Wellington and the unincorporated area around Price and Wellington, is being used at 50 to 60 percent of its capacity. In Emery County, the system that serves Cleveland, Elmo, Huntington, Orangeville, and Castle Dale would have enough capacity for more connections to meet the needs of the cumulative population growth resulting from unitized development and the interrelated projects.

LOCAL GOVERNMENT FINANCES

Current financial data on the counties, communities, and other taxing districts in the area of influence are included under the proposed actions (Section 3.A.2, Socioeconomics). More fiscal information is provided in the Socioeconomic Technical Report (Argonne National Laboratory 1984).

Severe fiscal pressure is expected to result from unitized development unless impacts are mitigated by the applicants with some federal and state help. The rapid population growth would cause immediate service demand increases. Revenues would lag at first, and coordinated mitigation planning, such as that required by Utah Code Annotated Section 63-51-10 (Supp. 1981) (Senate Bill 170) and Carbon County Conditional Use Permit, would be needed to avoid severe short-term service inadequacies.

Because demands on local infrastructure from baseline growth would equal or exceed their present capacities in many cases, the increased demands imposed by applicant and interrelated projects would require significant increases in capacity, particularly in Carbon County. Expansions would be needed in classrooms, medical facilities, jails, many electrical, water, and sewer systems. Most of the additional capacity would be needed to meet the demands of the construction period, but most increased revenues from the developments would be gained only after the buildup of mining operations. Moreover, those revenues would accrue largely to the counties. The mines would be located in unincorporated areas, but much of the infrastructure costs would be borne by the communities.

Operating expenditures would be increased by needs for more administrative and professional staff members, greater demands for public safety and welfare services, and the increased operation and maintenance costs of the expanded infrastructure.

OTHER AFFECTED INDUSTRIES

According to Utah Division of Wildlife Resources data, unitized development collectively would increase annual expenditures in Carbon County by $537 from 1980 to 1985 and by $90,991 by 1995. Carbon County annual expenditures for nonconsumptive uses of wildlife would increase by $612 from 1980 to 1985 and by $97,276 by 1995. Unitized development and interrelated projects would cumulatively increase Carbon County's annual hunting and fishing expenditures by $97,864 from 1980 to 1985 and by $415,080 by 1995 and increase annual expenditures for nonconsumptive uses of wildlife by $104,723 from 1980 to 1985 and by $443,905 by 1995.

QUALITY OF LIFE

Population growth under unitized development could cause significant local social changes, particularly in East Carbon, Sunnyside, and Wellington. Those changes are described in detail in the proposed actions discussion (Section 3.A.2, Socioeconomics).

3.C.3 Soils and Vegetation

SOILS

Even though unitized development would affect soils, the applicants' proposed reclamation procedures and BLM-required procedures (Appendix A-7), would generally keep impacts from becoming significant. Some localized, very steep areas (about 5 to 8 percent of the area), resembling talus-like slopes with very low productive capacity, could remain in the reclaimed landscape. The size and productivity of these areas would be similar to the preconstruction occurrence of rock outcrop (canyon walls and escarpments). The mining disturbance and alteration of soil profiles and landscapes would cause short-term losses of soil productivity and an increase in soil loss by erosion from wind and water from the first initial disturbance until reclamation and the initial establishment of understory vegetation. Table 3-42 presents acreages (by soil groups) that would be disturbed.

TABLE 3-42
ACRES OF SOIL GROUPS AFFECTED AND DISTURBED
(Unitized Development Alternative)

Type of Disturbance	Total Acres Disturbed[a]	Soil Group A1[b]	F	M1	M2	M3	MS1	MS2	MS3	Undetermined[c]
Collective Totals										
Leases[d]	28,800	376	339	626	3,120	1,804	184	11,952	10,399	0
Mine (Surface)	21,093	344	—	42	1,557	1,734	28	7,905	9,483	0
Plant and Spent Sand Disposal	6,407(267)	382	6,025	0	0	0	0	0	0	0
Plant and In-Situ Mining	6,000	22	274	478	1,294	6	130	3,307	489	0
Ancillary Facilities	2,445(415)	0	0	0	0	0	0	0	0	2,445
Total	35,945	748	6,299	520	2,851	1,740	158	11,212	9,972	2,445
Interrelated Projects Totals										
Mine (Surface)	1,400	0	0	0	0	118	0	1,223	59	0
Plant and Spent Sand Disposal	1,200(200)	0	1,200	0	0	0	0	0	0	0
Ancillary Facilities	300	0	0	0	0	0	0	0	0	300
Total	2,900	0	1,200	0	0	118	0	1,223	59	300
Cumulative Total										
Leases[d]	28,800	376	339	626	3,120	1,804	184	11,952	10,399	0
Mine (Surface)	22,493	344	0	42	1,557	1,858	28	9,128	9,542	0
Mine (In-Situ)	6,000	22	274	478	1,294	6	130	3,307	489	0
Plant & Spent Sand Disposal	7,607	382	7,225	0	0	0	0	0	0	0
Ancillary Facilities	2,745(615)	0	0	0	0	0	0	0	0	2,745
Total	38,845	748	7,225	520	2,851	1,858	158	12,435	10,031	2,745

Note: Figures shown in parentheses are acreages that would be removed (plant sites and roads) for the life of project. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of project.

[b]Includes measured, delineated areas of flood plain soils; additional small areas not mappable due to map scale occur throughout the area of influence.

[c]Acreages not determined because locations of facilities are unknown at this time.

[d]Total lease area to be converted that is included in this alternative.

VEGETATION

Unitized development could significantly disturb vegetation, depending on the success of the proposed reclamation programs (Appendix A-7). Estimated acreages of different vegetation types that would be disturbed are shown in Table 3-43.

Significant vegetation impacts could occur in the areas disturbed in the low precipitation zones (climatic zones B and C, Map 3-2, map pocket of draft EIS), which would meet the significance criterion of not being able to establish a ground cover within 5 years. Other significant vegetation impacts would meet the criterion of not being able to restore pre-project vegetation type diversity due to changes in topography, slope, and aspect causing microclimatic changes. Such plants, mainly shrubs and trees, require special micro-environmental conditions. The 11,683 acres of aspen and conifer vegetation types would be most strongly affected by surface mining. These vegetation impacts would also affect wildlife (Section 3.A.4) and grazing (Section 3.A.9).

TABLE 3-43
ACRES OF VEGETATION TYPES AFFECTED AND DISTURBED
(Unitized Development Alternative)

Type of Disturbance	Total Acres Disturbed[a]	Riparian[b]	Salt Shrub	Pinyon-Juniper	Sagebrush-Grass	Mountain Shrub	Aspen	Mixed Conifer	Undetermined[c]
Collective Totals									
Leases[d]	28,800	376	0	2,048	4,773	10,594	4,050	6,959	0
Mine (Surface)	21,093	344	0	659	1,982	8,303	3,552	6,253	0
Plant and Spent Sand Disposal	6,407(267)	232	0	5,180	183	812	0	0	0
Plant and In-Situ Mining	6,000	22	0	1,149	2,309	1,844	260	416	0
Ancillary Facilities	2,445(415)	0	0		0	0	0	0	2,445
Total	35,945	598	0	6,988	4,474	10,959	3,812	6,669	2,445
Interrelated Projects Totals									
Mine (Surface)	1,400	0	0	0	58	140	373	829	0
Plant and Spent Sand Disposal	1,200(200)	0	1,000	200	0	0	0	0	0
Ancillary Facilities	300	0	0	0	0	0	0	0	300
Total	2,900	0	1,000	200	58	140	373	829	300
Cumulative Total									
Leases[d]	28,800	376	0	2,048	4,773	10,594	4,050	6,919	0
Mine (Surface)	22,493	344	0	659	2,040	8,443	3,925	7,082	0
Mine (In-Situ)	6,000	22	0	1,149	2,309	1,844	260	416	0
Plant and Spent Sand Disposal	7,607(415)	232	1,000	5,380	183	812	0	0	0
Ancillary Facilities	2,745(615)	0	0	0	0	0	0	0	2,745
Total	38,845	598	1,000	7,188	4,532	11,099	4,185	7,498	2,745

Note: Figures shown in parentheses are acreages that would be removed (plant sites and roads) for life of project. Land disturbance acreages also include areas disturbed outside the STSA, consisting mainly of plant sites and spent sand disposal areas.

[a]Total acres disturbed refers to total area that would be disturbed for life of project.

[b]Includes measured, delineated areas of flood plain soils; additional small areas not mappable due to map scale occur throughout the area of influence.

[c]Acreage not determined because locations of facilities are unknown at this time.

[d]Total area to be converted that is included in this alternative.

3.C.4 Wildlife

Under the unitized development alternative, impacts to wildlife habitat and populations would occur on 38,845 acres over a 94-year period (from first disturbance through final revegetation). These disturbances would have the same effects as those discussed for the proposed actions (Section 3.A.4, Wildlife) and would involve 38 percent of the main block's wildlife habitat.

The habitat disturbance would occur progressively over the 94 years, as shown on Figure 2-1. The number of acres disturbed at one time would increase gradually for about 25 years until steady-state full production is achieved. Then, for a period of 60 years, about 3,500 acres would be disturbed at any one time. During the final 9 years, disturbance would rapidly decrease.

The building of right-of-way facilities would disturb 2,745 acres for 1 to 2 years, 2,445 acres of which would be disturbed by the five applicants on the proposed conversion areas. Surface mining and in-situ recovery would disturb 27,093 acres of the 28,800 acres proposed for conversion.

Spent sand disposal would cumulatively disturb 7,140 acres, of which 6,140 acres of disturbance would result from unitized development and 1,000 acres from interrelated projects. Under unitized development, spent sand would be disposed of at two locations—a 3,500-site area southwest of Sunnyside (climatic zone B, Map 3-2, map pocket of draft EIS) and a 3,640-acres site northwest of Sunnyside (climatic zone C, Map 3-2, map pocket of draft EIS).

3.C.5 Recreation Resources

Unitized development would cause the same types of impacts to recreation resources and quality of the user experiences as would the proposed actions (Section 3.A.5, Recreation Resources). Over its 94-year life, unitized development would disturb 38,845 acres. At any one time, 3,500 acres would be removed from such dispersed recreation opportunities as sightseeing, hunting, camping, and off-road vehicle use.

On the basis of the number of acres to be disturbed at any one time and projected population increases in Carbon and Emery counties, unitized development would impair the quality of sightseeing and dispersed camping, especially in the Bruin Point area. Primary access routes to favorite recreation areas would be altered or eliminated.

Hunting opportunities and quality user experiences would decrease due to the population growth accompanying tar sand development and habitat reductions resulting from surface mining and in-situ recovery. Small deer concentrations would likely be affected (Section 3.C.4, Wildlife).

Hiking and backpacking opportunities would be lessened by land disturbance, and the quality of these experiences would be degraded by the noise and visual intrusions of surface mining and in-situ recovery.

3.C.6 Visual Resources

Visual resources would be significantly impaired if the converted leases are developed as assumed for unitized development. A total of 20,332 acres of land classed as VRM Class II would be significantly changed, as would 7,268 acres of VRM Class III, and 5,250 acres of VRM Class IV. The impacts of disturbing 2,445 acres at unknown locations for ancillary facilities cannot be determined. See Table 3-44 for a more detailed summary of visual resource impacts.

Although the duration of mining has been defined and vegetation would be rehabilitated for most areas during the operational period of the project, the landform impacts introduced to the existing landscape would remain for the long term. Landforms permanently changed by unitized development would not be restored to the present condition to blend with portions of the natural landscape. The background created by the higher landforms of the STSA would be removed, significantly and permanently changing the region's visual character. Additionally, vegetation contrasts would be extensive for surface mining and in-situ extraction because adequate revegetation to reduce the visual contrast to a satisfactory level would occur only in the long term. Landform and vegetation impacts created by spent sand disposal and new structures at plantsites would likewise be long term. Only upon complete revegetation and removal of visually dominant structures would the significant impacts become acceptable.

TABLE 3-44
SUMMARY OF VISUAL RESOURCE EXISTING CONDITIONS AND SIGNIFICANT IMPACTS (ACRES)
(Unitized Development Alternative)

Component	VRM Class II[a] Existing[b]	VRM Class II[a] Significantly Affected[c]	VRM Class III[a] Existing[b]	VRM Class III[a] Significantly Affected[c]	VRM Class IV[a] Existing[b]	VRM Class IV[a] Significantly Affected[c]	Undetermined[d]
Mines	17,568	17,568	975	975	3,950	3,950	0
Plants	1,139	1,139	3,528	3,528	1,800	300	0
Spent Sand Disposal Areas	1,625	1,625	3,515	2,765	2,000	1,000	0
Ancillary Facilities	—	—	—	—	—	—	2,445
Total Impacts	20,332	20,332	8,018	7,268	7,750	5,250	2,445

[a]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.
[b]Acres of existing VRM class in conversion areas included in the partial conversion alternative.
[c]Acres that would be significantly affected as defined in Section 3.A.6, Impact Significance Criteria.
[d]Indicates the acreages that would be required for ancillary facilities whose specific locations and impacts are unknown at this time.

3.C.7 Air Quality

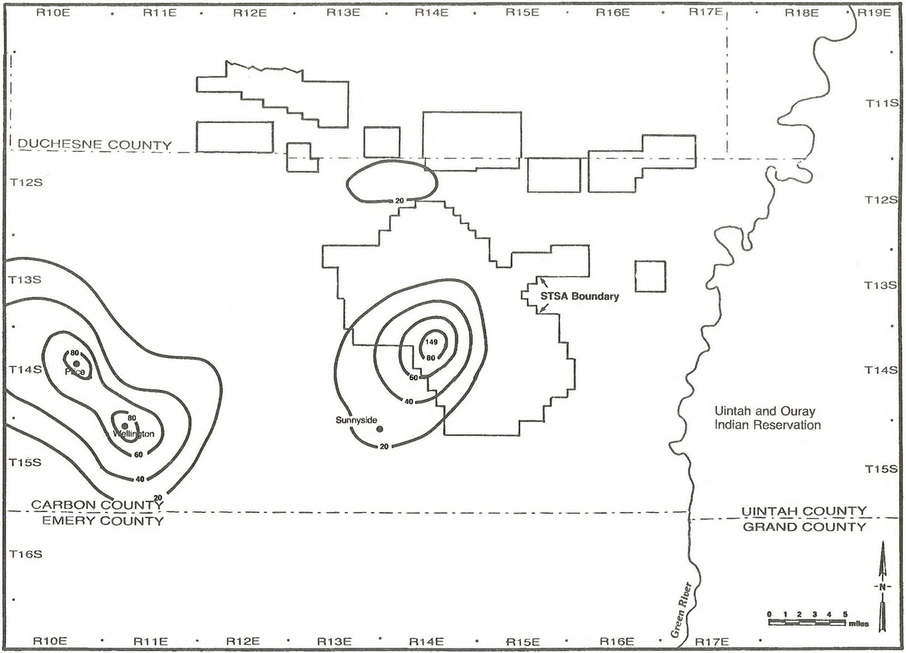
Table 3-45 lists the unitized development alternative's concentration values compared to the National Ambient Air Quality Standards (NAAQS) and year 2005 estimated background levels of the receptors showing the highest concentration.

The total suspended particulate (TSP) NAAQS is expected to be exceeded, as shown in Map 3-11. Prevention of Significant Deterioration (PSD) Class II increments would be exceeded for TSP over a large area due to surface mining. No known fugitive dust control measures could fully mitigate the TSP impacts.

TABLE 3-45
MAXIMUM SO_2, TSP, AND NO_2 CONCENTRATIONS
(Unitized Development Alternative)

Areas of Special Concern	Maximum Average Concentrations ($\mu g/m^3$) SO_2 3-hour	SO_2 24-hour	SO_2 Annual	TSP 24-hour	TSP Annual	NO_2 Annual
NAAQS	1300	365	80	150	60	100
Class II Areas PSD Class II Increment	512	91	20	37	19	NA
Areas Near Sunnyside STSA Impacts	312(18)	120(7)	12(1)	596(148)	149(40)	63(2)
Uintah and Ouray Indian Reservation Impacts	8(18)	2(7)	<1(1)	<1(148)	<1(40)	<1(2)

Note: Selection of a different grid origin could result in slightly different maximum concentrations and locations of those maximum due to the terrain variability.
Figures in parentheses represent 2005 Baseline Source Concentrations.



MAP 3-11 ANNUAL TSP CONCENTRATIONS (ug/m^3)
(Unitized Development Alternative)

The sulfur dioxide (SO_2) 24-hour PSD increment would be exceeded due to stack gas emissions affecting elevated terrain. Only a small area would be involved, and the impact could be mitigated in several ways. A proposed location change, 5 miles southwest of the modeled proposed plantsite for unitized development, is not expected to change the results of the analysis presented in the Air Quality Technical Report (Aerocomp Inc. 1983). Impacts that would be most significant and difficult to mitigate would be those of surface mining. A location change for the plantsite could, in fact, be a mitigation measure to reduce stack impacts.

The level 2 visibility screening results are summarized in Table 3-46. Visibility is not expected to be impaired at Arches, Capitol Reef, or Canyonlands national parks or at Dinosaur National Monument. The Uintah and Ouray Indian Reservation could experience visual impacts resulting from nitrogen oxide (NO_x) emissions in that the plume might be perceptible against the sky or a light background.

TABLE 3-46
LEVEL 2 VISIBILITY ANALYSIS
(Unitized Development Alternative)

Observer Point Location	Contrast Reduction	Visual Range Reduction	Blue-Red Ratio
Panorama Point Arches National Park	0.019	1.8	0.99
Cathedral Valley Overlook Capitol Reef National Park	0.017	1.6	1.00
Murray Point Overlook Canyonlands National Park	0.018	1.7	1.00
Moonshine Rapids Dinosaur National Monument	0.014	1.3	0.98
Buck Knoll Uintah and Ouray Indian Reservation	0.048	4.7	0.88
Peters Point Uintah and Ouray Indian Reservation	0.018	1.7	0.89
EPA Recommended Guidelines	0.100	11.0	0.90

Note: Results presented are for the tar sand development assumed for this alternative.
The recommended criteria has to be exceeded for impacts to contrast and visual range reduction. Visual impacts occur for blue-red ratios less than 0.9.

3.C.8 Transportation Networks

Construction and operation of the 50,000 bpd processing plant and the 20 interrelated coal mines could significantly increase traffic and tonnage carried along segments of US 6 between the SR 123 junction and the town of Helper, along SR 123 between US 6 junction and Sunnyside, and along SR 10 between Price and Castle Date. Rail tonnage would significantly increase on the Denver and Rio Grande Western (D&RGW) spur between Mounds and Sunnyside, and the need for road maintenance would significantly increase because of traffic volume increases (even though the level-of-service would not change). Finally, new road building, realignment, and upgrading would be needed in the STSA to allow the use of heavy trucks and equipment. Such road work would cause land disturbance and would significantly impair visual resources.

Peak years in the construction and operation of the processing plant and interrelated coal mines were selected for evaluating impacts. Capacity analyses were completed for annual average monthly traffic and monthly average daily traffic.

Under the greatest peak demand condition for the projected peak traffic volume years (1995 and 2003), road segments would fall below level-of-service C. These projections were based on service volumes for level-of-service C and computations from standards established by the American Association of Highways and Transportation Officials and used by the Utah Department of Transportation (UDOT) as a design standard for rural minor arterial and major collectors. According to the UDOT, 1982 traffic operations and roadway facilities serving the STSA are in a stable flow condition.

Table 3-47 shows projected baseline estimates, vehicle trips per day, total peak vehicle trips per day, precentage increase over the projected baseline, and the level-of-service for peak construction-operation overlap years and operation years. The table includes 16 roadway segments on US 6 between Green River and Helper, on SR 123 between the US 6 junction and Sunnyside, and on SR 10 between Price and Castle Dale.

During the peak construction-operation year (1995), the assumed tar sand development would generate 2,290 more vehicle trips per day than the baseline projection for segments of US 6 between Green River and Helper, SR 123 between the US 6 junction and Sunnyside, and SR 10 between Price and Castle Dale. The peak operation year (2003) would generate 5,770 more vehicle trips per day than the baseline projection for these segments. Table 3-47 shows four segments in 1995 and nine in 2003 that would undergo significant long-term impacts due to the lowering of the level-of-service below C. See Map 1-3 (Section 1.A.5) for the location of these segments.

Tar sand development and the 20 interrelated coal mines would add 11,002 vehicle trips per day to the projected baseline for the roadway system (US 6, 10 and 123) during 1995, and 14,282 vehicle trips per day during 2003. Interrelated projects would extend impacts to more roadway segments on SR 10 between Price and Castle Dale. Table 3-47 lists nine segments that would be significantly affected (level-of-service would fall below C).

The vehicle accident rate per million vehicle miles traveled (MVMT) on US 6 between Soldier Summit and Green River for 1982 was 1.22, which is less than the State of Utah's expected rate of 2.06 for this type of road. On SR 123 between US 6 junction and Sunnyside, the 1982 vehicle accident rate was 0.75 per MVMT, which is less than the expected rate of 2.88. And on SR 10 between Price and Castle Dale, the 1982 vehicle accident rate was 1.29 per MVMT, which also is less than the expected rate of 2.02. In 1982, vehicle accidents per MVMT amounted to 166 on US 6 between Soldier Summit and Green River, 6 on SR 123 between US 6 junction and Sunnyside, and 64 on SR 10 between Price and Castle Dale.

The increased traffic needed for tar sand development during the peak construction-operation overlap year of 1995 would increase vehicle trips per day by 0.51 percent and result in 41 more traffic accidents. During the peak operation year of 2003, vehicle trips per day would increase by 0.66 percent, and annual traffic accidents would increase by 53. Tar sand development and interrelated projects during the construction overlap year of 1995 would increase vehicle trips per day by 217 and annual traffic accidents by 174. During the peak operation year of 2003, vehicle trips per day would increase by 311 percent, and annual traffic accidents would increase by 248. These traffic accident increases would significantly lower traffic safety. See Table 3-47 and Map 1-3 for road segments where the level-of-service would fall below C and where traffic accidents could increase.

RAIL SYSTEM

The 5 million gross tons per year capacity of the D&RGW spur from Mounds to Sunnyside would be exceeded by the sum of the following: (1) the existing 3.2 million gross tons shipped by rail on this spur each year, (2) the 1.4 million tons expected to be shipped from the tar sand processing plant, and (3) the 7.2 million tons expected to be shipped from the three interrelated coal mines in the Sunnyside area. Under the worst case, half of the 50,000 bpd or 1.4 million gross tons per year would be shipped by rail from Sunnyside. Such shipments would require loading 46, 85-ton railroad tank cars per day, amounting to one 84-car unit train every 2 days or a four-unit train in and out of Sunnyside every 4 days. Such loads could significantly overload the rail spur for the long term.

Unitized Devleopment—Transportation Networks.

TABLE 3-47
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Unitized Development Alternative)

	COLLECTIVE IMPACTS												
	Construction-Operation Overlap Impacts								Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	Level-of-Service Projected Baseline[c]	2003 Level-of-Service Baseline[c]	Projected 2003 Baseline Estimate (VTPD)[a]	2003 Applicant Related Increase (VTPD)	Total Peak VTPD	Percent Increase Projected Baseline	Level-of-Service Projected Baseline[c]
US 6 Junction SR J39	1	C	13,566	140	13,706	1	C	C	14,690	280	14,970	2	C
FAS 298 (old road) SR 55 West of Prica	2	B	8,753	190	8,943	2	C	B	9,478	280	9,759	3	C
Bypass Road S of Price	3	B	10,100	365	10,465	4	C	B	10,936	670	11,605	6	C
West Incl. Wellington	4	C	7,372	1,240	8,612	17	D	C	7,982	2,790	10,772	35	D
East Incl. Wellington	5	B	5,021	1,480	6,501	29	C	B	5,437	3,380	8,817	62	D
Woodside-FAI 70 Wast of Green River	6	B	2,765	60	2,825	2	B	B	2,994	95	3,089	3	B
SR 123 Junction US 6	7	B	2,914	1,700	4,614	58	C	B	3,155	4,035	7,190	128	C
Junction SR 124	8	C	4,325	2,135	6,460	49	D	C	4,783	5,170	9,953	108	F
South Incl. Sunnysida-North Incl. Sunnyside	9	B	2,160	2,290	4,450	106	C	B	2,338	5,570	7,908	238	E
SR 10 East Incl. Castla Dala	10	C	3,687	65	3,752	2	C	C	3,993	140	4,133	4	C
Junction SR 29	11	D	5,688	65	5,753	1	C	D	6,159	140	6,299	2	D
South Incl. Huntington	12	D	7,290	110	7,400	2	D	D	7,894	235	8,129	3	E
Junction SR 155 Road to Elmo	13	C	4,162	160	4,322	4	C	C	4,508	375	4,883	8	C
Carbon/Emery County Line	14	C	4,163	165	4,328	4	C	C	4,508	380	4,888	8	C
Junction SR 122	15	C	4,326	170	4,496	4	C	C	4,684	385	5,069	8	C
Price South Incl. Prica	16	D	7,165	175	7,340	2	D	D	7,759	390	8,149	5	D

TABLE 3-47 (Concluded)
PROJECTED HIGHWAY ANNUAL AVERAGE MONTHLY TRAFFIC
(Unitized Development Alternative)

			CUMULATIVE IMPACTS										
			Construction-Operation Overlap Impacts						Operation Impacts				
Road Segment	Traffic Control Point Location[a]	1989 Level-of-Service Baseline[c]	Projected 1989 Baseline Estimate (VTPD)[b]	1989 Applicant-Related Increase (VTPD)	Total Peak (VTPD)	Percent Increase Over Projected Baseline	Level-of-Service Projected Baseline[c]	2003 Level-of-Service Baseline[c]	Projected 2003 Baseline Estimate (VTPD)[a]	2003 Applicant Related Increase (VTPD)	Total Peak VTPD	Percent Increase Projected Baseline	Level-of-Service Projected Baseline[c]
US 6 Junction SR J39	1	C	13,566	910	14,476	7	C	C	14,690	980	15,670	7	C
FAS 298 (old road) SR 55 West of Price	2	B	8,753	1,690	10,443	19	C	B	9,478	1,530	11,009	16	C
Bypass Road S of Price	3	B	10,100	4,860	14,960	48	C	B	10,936	4,970	15,906	45	C
West Incl. Wellington	4	C	7,372	4,135	11,507	56	E	C	7,982	5,610	13,592	70	E
East Incl. Wellington	5	B	5,021	3,340	8,361	66	C	B	5,437	5,170	10,607	95	D
Woodside-FAI 70 West of Green River	6	B	2,785	110	2,875	4	B	B	2,994	140	3,134	5	B
SR 123 Junction US 6	7	B	2,914	2,545	5,459	87	C	B	3,155	4,790	3,134	5	C
Junction SR 124	8	C	4,325	2,350	6,675	54	D	C	4,783	5,370	10,153	112	F
South Incl. Sunnyside-North Incl. Sunnyside	9	B	2,160	2,510	4,670	116	C	B	2,338	5,770	8,108	246	D
SR 10 East Incl. Castle Dale	10	C	3,687	760	4,438	20	C	C	3,993	905	4,898	23	C
Junction SR 29	11	D	5,688	760	6,448	13	D	D	6,159	1,160	7,319	19	D
South Incl. Huntington	12	D	7,290	1,275	8,565	17	E	D	7,894	1,510	9,404	19	E
Junction SR 155 Road to Elmo	13	C	4,162	1,425	5,587	34	D	C	4,508	1,760	6,268	39	D
Carbon/Emery County Line	14	C	4,163	1,455	5,618	34	C	C	4,508	1,770	6,278	39	C
Junction SR 122	15	C	4,326	1,470	5,796	34	D	C	4,684	1,790	6,474	38	D
Price South Incl. Price	16	D	7,165	1,490	8,655	21	E	D	7,757	1,810	9,569	23	E

Note: VTPD = vehicle trips per day; Incl. = including.

[a]Refers to locations shown on Map 1-3.

[b]Projected 1981 highway traffic volume for US 6, SR 123 and SR 10 by one percent compounded.

[c]American Association State Highway and Transportation (1965) Levels-of-Service. A = free traffic flow, accompanied by low volumes and high speeds; B = stable traffic flow, with operating speeds beginning to be restricted by traffic conditions; C = stable traffic flow, but drivers are restricted in their freedom to select speed, change lanes, or pass; D = approaches unstable traffic flow, with fluctuations in volume and temporary restrictions to flow, which may cause substantial drops in operating speeds; E = unstable traffic flow, with momentary stoppages; F = forced traffic flow, with low speeds and short or long stoppages because of downstream congestion. Level-of-Service = Baseline x factor (Volume Per Hour) - factor (Volume Capacity Ratio and calculated on a highway speed of 60 mph under uninterrupted flow conditions).

Finding enough space to build speed loading facilities for the rail tank cars and storage for the load for at least one 84-unit train at one time would not be a problem because the processing plant would be placed next to Kaiser's rail storage yard. The passing of the 84-unit coal train from the mines through Sunnyside, however, could create congestion, as could the passing of the 100-unit coal train and the storing of coal cars in Kaiser's rail storage yard.

PUBLIC TRANSPORTATION

The increased population projected for the affected area for 2005 (83,100 people) could significantly benefit public transportation by enabling the Price and Sunnyside airports to support commercial flights.

Unitized development would not significantly change passenger rail or bus service, but population increases could provide the impetus to establish bus service on SR 10 to Huntington, Cleveland, Elmo, Orangeville, and Castle Dale.

3.C.9 Agriculture

GRAZING

Unitized development would cause an annual loss of 344 AUMs of forage, amounting to a reduction of 86 head of cattle for a 4-month grazing season. Of this total, 322 AUMS of forage would be lost as a result of activities of the five applicants on the proposed conversion areas, amounting to a 80-head reduction of cattle. Table 3-48 gives the number of operators, allotments, and the percentage of each allotment affected. Unitized development would affect five allotments and possibly one allotment at an undetermined disposal site, but a reduction in livestock numbers is not expected. Grazing would be disturbed over a period of 94 years.

Mining could threaten the existence of one or two ranch operations, but these operations would survive if mining is planned and conducted to permit the least possible grazing disruption at any one time. Unitized development could allow for more effective use of the area's forage during the mining period than would the other alternatives. Because of the type and steepness of terrain within the area, however, an intensive mining-grazing program would be needed to ensure grazing access, adequate livestock water and water distribution, and effective forage use on the undisturbed and reclaimed land.

The small population increase would slightly increase impacts to grazing use, such as cattle harassment, increased vandalism of fences and range facilities, and livestock road kills.

See the proposed actions (Section 3.A.9. Agriculture) for a detailed discussion of grazing impacts that would result from surface mining, spent sand disposal, and in situ recovery. See Map 1-3 for grazing allotment names and boundaries.

CROPLAND

Although no cropland occurs within the STSA, cropland is expected to be lost outside the STSA due to population expansion (Section 3.A.9, Agriculture). Population increases due to mining would cause the conversion of 1,439 acres of land to homesites and related support facilities in the area of Price, Wellington, and Sunnyside. The 475 acres of cropland converted to urban uses would be an insignificant impact.

3.C.10 Cultural Resources

Unitized development would have the same impacts on cultural resources as would the proposed actions (Section 3.A.10, Cultural Resources).

3.C.11 Paleontology and Mineral Resources

Unitized development would have same impacts on these resources as those described for the proposed actions (Section 3.A.11, Paleontology and Mineral Resources).

3.C.12 Wilderness Resources

Unitized development would not directly affect Turtle Canyon, Desolation Canyon, or Jack Canyon wilderness study areas (WSAs) because none of the conversion areas or related facilities included in this alternative would overlie these unit boundaries.

TABLE 3-48
GRAZING ALLOTMENTS AFFECTED AND GRAZING LOSSES CAUSED BY UNITIZED DEVELOPMENT ALTERNATIVE

Allotment Name and Number	Number of Operators	CURRENT STATUS Acreage Public	Total	Active Reference (AUMs)	POTENTIAL GRAZING LOSSES (AUMs)[a] Total	Percent of Allotment
Cow Canyon (4032)	4	2,145	—	71 (30 Ac/AUM)	54 (6)	76 (6)
Dry Canyon (4038)	1	14,805	20,680	890 (17 Ac/AUM)	435 (65)	49 (7)
Green River North (4049)	1	122,945	166,621	8,584 (14 Ac/AUM)	502 (75)	6 (0.1)
Sheep Canyon (4103)	7	9,170	18,302	696 (13 Ac/AUM)	531 (79)	76 (11)
Stone Cabin (4109)	2	23,014	30,518	1,625 (14 Ac/AUM)	116 (17)	7 (1)
Icelander (4056)	1	40,008	46,788	2,691 (14 Ac/AUM)		
Outside[b]	2	—	—	NA (16 Ac/AUM)	192 (34)	NA NA
Undetermined[c]	—	—	—	NA (13 Ac/AUM)	461 (68)	NA NA
Total AUMs Lost/Year					(344)	

Note: AUM = animal unit month; AC/AUM = acres per animal unit month; NA = not applicable.

[a]Figures without parentheses represent forage production (AUMs) per year for the entire proposed conversion area or area affected. Figures enclosed by parentheses represent average forage production (AUMs) lost per year due to mining activities based on 5-year reclamation schedule (with exception of Amoco).

[b]Grazing parcels outside of named allotment boundaries.

[c]Area assumed to be in the Mud Springs and Icelander grazing allotments, to determine AUMs.

The secondary impacts to the wilderness resources of these units and impacts to the quality of the wilderness user experiences would be the same as those described for the proposed actions (Section 3.A.12, Wilderness Resources). Because commercial operations would continue over a 60-year period, however, only 3,500 acres of the resource land base would be disturbed at any one time, and impacts to wilderness characteristics (naturalness and solitude) in these units would be slight. Plumes from the tar sand processing plant, however, could be seen against the sky or light background due to nitrous oxides along the northern portion of the Desolation Canyon and Jack Canyon WSAs. Population increases in the local area would only slightly disturb solitude or increase user conflicts.

3.C.13 Conflicts With Land Use Plans, Policies, and Constraints

Unitized development would not conflict with existing land use plans or controls except with the special watershed management areas as discussed for the proposed actions (Section 3.A.13, Conflicts with Land Use Plans, Policies, and Constraints).

3.D NO ACTION ALTERNATIVE

Under the no action alternative, the proposed lease conversions would be denied, ending most oil and

gase leases in question. This analysis assumes, however, that the interrelated projects (Chevron's tar sand project and 20 coal mines) would be developed.

With the exception of air quality, the impacts of the no action alternative would correspond directly with the impacts of the interrelated projects analyzed for the proposed actions (Section 3.A, Proposed Actions). For example, local economic benefits from the development are discussed in Section 3.A.2, Socioeconomics, Quality of Life. No action would thus not directly affect federal land within the STSA.

The no action alternative emissions inventory includes the county-wide emission sources from the 1981 inventory increased proportionally by the expected population growth plus the direct emissions and secondary growth emissions from a tar sand surfâce mine and a 10,000 barrel per day (bpd) plant facility.

Map 3-12 shows the expected annual total suspended particulate (TSP) levels for the no action alternative. The area near Price and Wellington is expected to exceed National Ambient Air Quality Standards (NAAQS). A small area centered on the projected tar sand surface mine is also expected to exceed NAAQS. By 2005 the surface mine is expected to increase TSP by an annual average of 39 micrograms per cubic meter (ug/m³) and 154 ug/m³ for the 24-hour maximum, as shown in Table 3-49. Added to the impacts for the baseline sources, these values yield a maximum predicted annual total of 79 ug/m³ and 322 ug/m³ for the 24-hour maximum. In the Price area, the estimated maximum TSP receptor has an annual average value of 118 ug/m³ and a 24-hour value of 458 ug/m³, due to population growth alone.

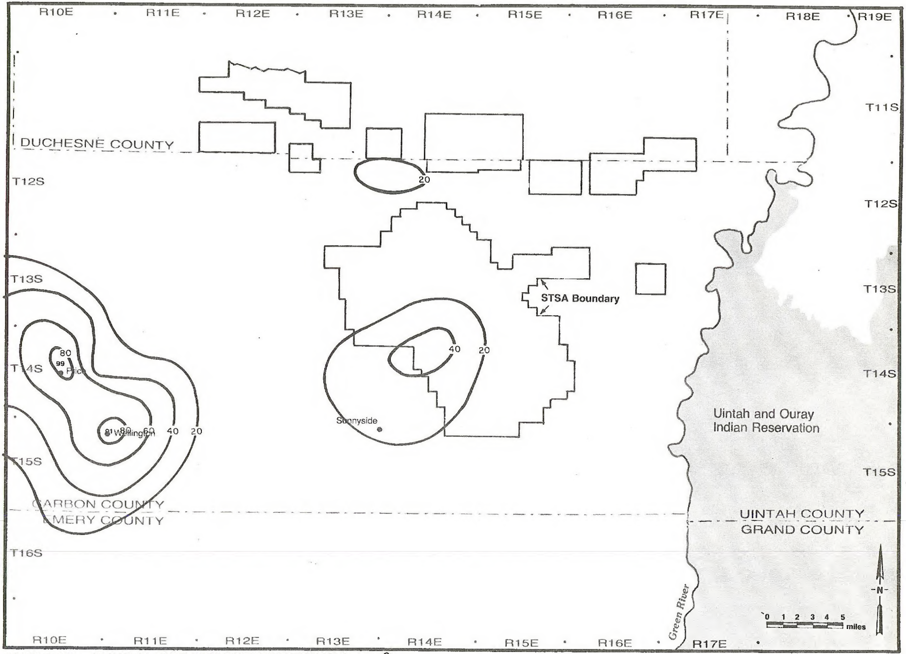
Should conversion of the leases be denied, the purposes of the proposed actions would not be achieved. Similarly, the national goal to reduce dependence on foreign oil sources would be harder to achieve without the production of oil from tar sand. Potential oil production from the STSA and the contribution to the United States oil supply are described in Section 1.A.2, Purpose and Need for Proposed Action.

TABLE 3-49
MAXIMUM SO_2, TSP, AND NO_2 CONCENTRATIONS
(No Action Alternative)

	Maximum Average Concentrations ($\mu g/m^3$)					
	SO_2			TSP		NO_2
Areas of Special Concern	**3-hour**	**24-hour**	**Annual**	**24-hour**	**Annual**	**Annual**
NAAQS	1300	365	80	150	60	100
Class II Areas PSD Class II Increment	512	91	20	37	19	NA
Areas Near Sunnyside STSA Impacts	126(18)	35(7)	3(1)	154(148)	39(40)	49(2)
Uintah and Ouray Indian Reservation Impacts	2(18)	1(7)	1(1)	1(148)	1(40)	1(2)

Note: Selection of a different grid origin could result in slightly different maximum concentrations and locations of those maximum due to the terrain variability.

Figures in parentheses represent 2005 Baseline Source Concentrations.



MAP 3-12 ANNUAL TSP CONCENTRATIONS (ug/m³)
(No Action Alternative)

CHAPTER 4

SITE-SPECIFIC MITIGATION, MONITORING, AND UNAVOIDABLE, ADVERSE, LONG-TERM ENVIRONMENTAL CONSEQUENCES, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

CHAPTER 4
SITE-SPECIFIC MITIGATION, MONITORING, UNAVOIDABLE ADVERSE IMPACTS, LONG-TERM ENVIRONMENTAL CONSEQUENCES, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Chapter 4 describes more mitigation measures, applicant baseline survey and monitoring programs, and the unavoidable adverse impacts of the proposed actions. Also provided is a perspective on the effects of implementing all applicant proposed plans of operations on the long-term use of man's environment. Of special concern are new trends that would be established, short- and long-term benefits and trade-offs, and irreversible and irretrievable commitments of resources. In this context, "short-term" is defined as 1 to 10 years, the average construction period for most of the applicants; "long-term" is defined as longer than 10 years.

BLM projected the impacts detailed in Chapter 3 using a worst-case analysis, which assumed that all portions of the proposed conversion area would be disturbed to varying degrees. The degree of disturbance would range from open pit mining and vegetation removal to the crushing of vegetation by vehicles on travelways.

4.A SITE-SPECIFIC MITIGATION

Following impact assesment, more mitigation measures were identified that could further alleviate or lessen environmental effects. These measures, which will be required by BLM, would protect special watershed management areas, soils and vegetation, critical wildlife habitat, and unique landforms. These measures and the areas where they will be applied are listed below and are shown on Map 4-1.

Sunnyside Water Supply Reserve

1. Occupation or disturbance of lands that have been formally designated as a municipal water supply reserve for the town of Sunnyside, Utah, will require approval by both the Secretary of the Interior and the town of Sunnyside. Exploration, mining, or other surface disturbance will require complete containment of any runoff water, mine waste, sediment, or other potential contaminant. Discharge of any type from any disturbed site will be allowed only within the standards allowed by law. This measure will reduce the impact of the project on water quality, sedimentation, and soil erosion.

Public Water Reserves/Riparian Areas

2. To protect important aquifers, all surface and in-situ mining will be preceded by adequate hydrological testing and evaluation. Results of testing will be provided to the Environmental Protection Agency and the State of Utah for use in developing special permit conditions to assure the protection of underground sources of drinking water. Any loss of springs or reduction in perennial streamflow will be replaced with water of an equal quantity and quality. The proposed actions would destroy 24 springs (39 percent) in the STSA, reducing water for wildlife and livestock and decreasing the distribution of livestock and less mobile wildlife. This mitigation measure would replace water and preserve the distribution of animals throughout the STSA.

Soils, Vegetation, and Reclamation

3. Occupancy or other surface disturbance will not be allowed on slopes exceeding 50 percent without BLM's written permission. This measure, which does not apply to surface mining, will reduce the impacts of the projects on water, soil, vegetation, visual, and wildlife resources by protecting from disturbance all 600 acres of slopes exceeding 50 percent. The BLM authorized officer may specify exceptions to this limitation.

4. No more than 25 percent of the surface area of the sites shown on Map 4-1 will be disturbed from surface mining at any given time. Disturbed areas will be reclaimed and substantially revegetated before more areas can be disturbed by mining. Exceptions to this limitation may be specifically authorized by BLM. This measure will reduce the impact of the project on water resources, livestock grazing, wildlife, soils, and vegetation.

5. Surface mining will not be allowed in aspen vegetation communities without off-site enhancement of similiar vegetation communities with equal wildlife values. Exceptions in any year may be authorized in writing by BLM. This measure will reduce the impact of the project on vegetation and wildlife. The proposed actions would destroy 4,107 acres of aspen in the STSA. This mitigation measure would enhance areas of aspen outside the mining area and reduce adverse impacts.

Wildlife Resources

Measures 6 through 9 will be initiated where deemed necessary by BLM after consultation with the Utah Division of Wildlife Resources.

6. To protect nesting sage grouse, exploration, drilling, and other development will not be allowed from April to mid-June. This limitation applies to the exploration and pilot phases but does not apply to maintenance and operation of developed mines. The proposed actions would disturb 557 acres of sage grouse nesting habitat. This mitigation measure would protect these areas from disturbance and maintain production at present levels for an additional year.

7. To protect deer winter range, exploration, drilling, and other development will not be allowed from November to mid-May. This limitation does not apply to maintenance and operation of developed mines. This measure will reduce the impact of the project on deer.

8. To protect important elk calving and deer fawning areas, exploration, drilling, and other development will not be allowed from mid-May through mid-July. This limitation does not apply to maintenance and operation of developed mines. This measure will reduce the impact of the project on elk and deer.

9. To protect deer summer range, exploration, drilling, and other development will not be allowed from mid-May to November. This limitation does not apply to maintenance and operation of developed mines. This measure will reduce the impact of the project on deer.

4.B MONITORING

4.B.1 Monitoring Requirements

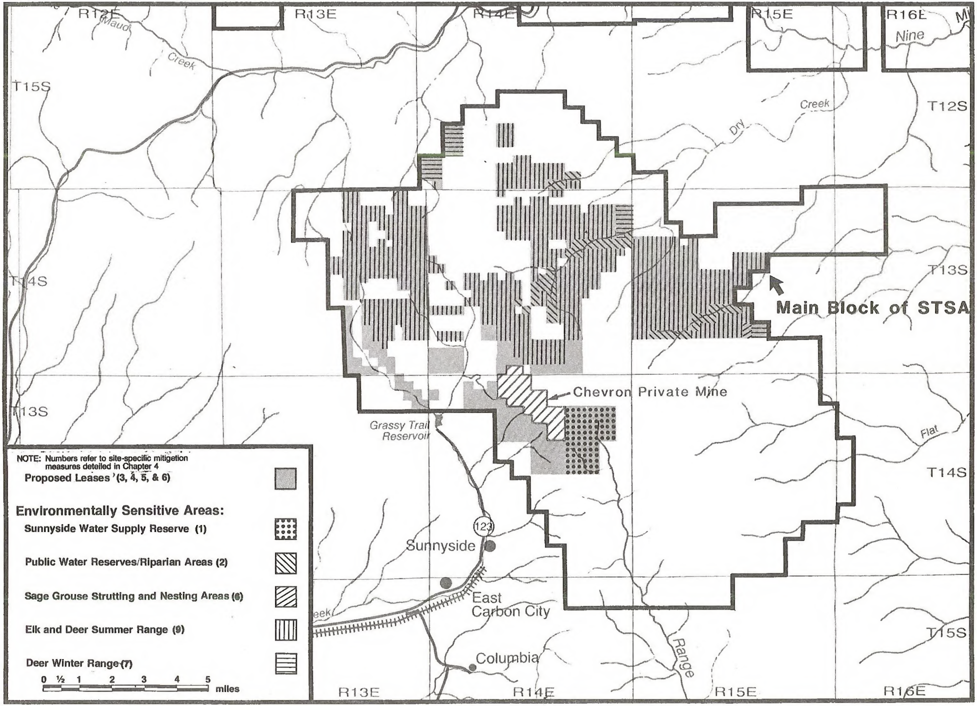
The potential for lease conversions and the amount of mining that could result in the main block would affect the resources discussed in the preceding chapters. Changes to some resources, such as visual resources, socioeconomics, and transportation networks would be obvious. Determining how other resources are changing and when the change reaches a stable level would be more difficult. Because of the subtlety of changes to some resources, monitoring programs are often the only way to determine the amount of change. Baseline monitoring programs are useful for establishing specific and detailed baseline conditions. From this base, resource changes can be noted through later impact monitoring.

The authorizing agency has the right to require monitoring, but that responsibility is often delegated to state agencies. In the Sunnyside STSA, the responsibility for compliance with permits serves as the basis for monitoring.

The Utah Bureau of Air Quality requires that meteorological data be monitored 1 year before construction (which is the same as the Prevention of Significant Deterioration (PSD) permit requirement) and for 1 year during full production.

The Utah Division of Oil, Gas, and Mining is the monitoring agency for reclamation. When a mine plan is submitted, a reclamation plan and performance bond must accompany it. The Division monitors the success of the reclamation for 3 years and also has the right to require ground water monitoring.

The Utah Bureau of Water Pollution Control uses the background water sampling requirement of the National Pollutant Discharge Elimination System (NPDES) permit to provide data to establish baseline water quality. Standards that apply to streams in the area also apply. The Bureau of Water Pollution Control also monitors water quality by sampling discharges at unannounced times.



MAP 4-1 MITIGATION MEASURES

4.B.2 Applicants' Baseline and Impact Monitoring Programs

The applicants will be required to implement monitoring or research programs for three resources: air quality, vegetation (reclamation), and water resources (surface water and ground water). Table 4-1 shows each applicant's baseline and impact monitoring programs.

The amount of existing baseline data varies with each of these resources. The federal air quality permitting system requires the submittal of 1 year of baseline meteorological data. A limited data base exists until this data is provided. Vegetation and soil inventories exist for most of the main block. Baseline information for reclamation is complete. Much water resource data exists for the large river systems that drain the area, but almost no site-specific data exists for ground water and streams that drain the lease tracts.

TABLE 4-1
APPLICANTS' BASELINE SURVEYS AND IMPACT MONITORING PROGRAMS

Applicant	Air Quality	Reclamation	Water Resources
AMOCO			
Baseline Survey	None	None	Piezometers installed in 6 drill holes - stream gauge on Range Creek.
Impact Monitoring	Dust emissions continually assessed by a particulate monitoring program.	During pilot mine operations, reclamation techniques would be evaluated for suitability in commercial development.	Above data would be used to design a monitoring system for commercial operation.
CHEVRON-GNC			
Baseline Survey	North American Weather Consultants collecting baseline data; to end in May 1983.	None	Prior to mining, water quality information would be collected.
Impact Monitoring	None	During mining, a reclamation research program would be developed.	Water quality data to be collected during mining.
ENERCOR			
Baseline Survey	None	Pre-mining baseline studies; plant species, soil amendments, and planting time.	None
Impact Monitoring	None	Vegetation success and erosion control to be monitored.	None

TABLE 4-1 (Concluded)
APPLICANTS' BASELINE SURVEYS AND IMPACT MONITORING PROGRAMS

Applicant	Air Quality	Reclamation	Water Resources
SABINE			
Baseline Survey	None	None	None
Impact Monitoring	Environmental monitoring would be formulated.		
MONO			
Baseline Survey	Company conducted meteorological studies.	Preliminary vegetation investigation and preliminary wildlife investigation.	Ground water quantification
Impact Monitoring	Site-specific meteorological and air quality monitoring for 1 year.	Vegetation classification and wildlife classification. Archaeological investigation. Soils classification. Chemical analysis of topography, geology, and overburden. History and current land use.	Identification and analysis of subsurface hydrologic system. Identification and analysis of surface hydrologic regime. Alluvial valley floor determination.

4.C UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are those impacts discussed in Chapter 3 that would not be mitigated by measures discussed in Chapter 4, Section 4.A. Unavoidable adverse impacts are not discussed for partial conversion because this alternative would incorporate the constraints (or mitigation) and therefore would already eliminate or reduce such impacts. Moreover, specific mitigation has not been committed to for the adverse impacts to socioeconomics, recreation resources, air quality, transportation networks, cultural resources, agriculture, paleontology and mineral resources, and wilderness resources. These resources are thus not further discussed in this chapter because their total impacts have already been presented in Chapter 3. This section thus discusses only unavoidable adverse impact of the proposed actions and unitized development on water resources, soils and vegetation, wildlife, visual resources, and grazing (agriculture).

4.C.1 Proposed Actions

WATER RESOURCES

Mitigation measure 1 would reduce or eliminate impacts to the water supply reserves for the town of Sunnyside.

SOILS AND VEGETATION

Mitigation measures 3, 4, and 5 would eliminate or reduce the impacts to soil and vegetation, leaving 32,265 acres still disturbed.

Mitigation measure 4 would reduce the acres of soil and vegetation removed from productive use at any one time. Under the proposed actions 35,945 acres would be disturbed over the life of the projects, but only 6,500 acres would be disturbed at any one time. If future changes to mining plans increase the acres to be disturbed, 8,986 acres would be the most disturbed under the constraints of this measure.

WILDLIFE

Mitigation measures 2 through 9 would eliminate or reduce the adverse impacts to wildlife, leaving 32,265 acres disturbed.

Mitigation measure 4 would reduce the habitat removed from productive wildlife use at any one time. Under the proposed actions, 35,945 acres of wildlife habitat would be disturbed over the life of the projects, but only 6,500 acres would be disturbed at any one time (18 percent). If future changes to mining plans increase the acres to be disturbed, 8,986 acres would be the most disturbance at one time under the constraints of this measure.

The proposed actions would disturb 557 acres of sage grouse nesting habitat. Mitigation measure 6 would protect these areas from disturbance and maintain production at present levels for 1 more year. It would also ensure that sage grouse nesting is not disturbed needlessly by exploration if exploration shows that commercial development is not feasible.

The proposed actions would disturb 1,500 acres of deer winter range. Mitigation measure 7 would protect these areas from disturbance for 1 more year. This protection would reduce harassment of wintering mule deer and reduce the potential loss of production due to abortion or death of adult animals.

Some deer and elk fawning and calving areas would be disturbed by the proposed actions. Mitigation measure 8 would protect these areas from disturbance during the critical period for 1 more year. This protection would maintain production at current levels for 1 more year before numbers of young-of-the-year are expected to be reduced.

Summer ranges are critical to deer in this part of Utah because of the small amount that exists. The proposed actions would disturb 27,296 acres of this type of deer range. Mitigation measure 9 would protect these ranges for 1 more year before disturbance, enabling the current population to remain stable or even to increase for 1 more year.

4.C.2 Unitized Development Alternative

The residual unavoidable adverse impacts after implementing mitigation measures would be similar in kind to those discussed for the proposed actions in this section. The intensity of impacts to land disturbance, water use, employment and related population changes, some segments of air quality, transportation, and recreation, however, would be less because these impacts would be spread over a longer time.

4.D LONG-TERM ENVIRONMENTAL CONSEQUENCES

4.D.1 Trends Having Significant Impacts

Developing the proposed tar sand conversion leases at a commercial level would further advance synfuels technology in the United States and establish a trend for continuing tar sand resource use in the STSA. A successful and maturing tar sand industry could be established in the STSA by developing the proposed conversions as described in the applicants' proposed plan of operations. This development could result in future expansion of production above the applicants' initial projects or in developing more tar sand resources.

If tar sand resources in the STSA are developed, the area of influence, particularly in Carbon County, would have basically a two-industry economy. This dependence would make the area highly vulnerable to the cycles of that industry and to events and decisions affecting the industry over which local residents would have no control. Beneficial impacts of increased employment and income resulting from tar sand development would thus carry with them an increased risk of boom and bust.

The Clean Air Act (Public Law 95-95) ensures through National Ambient Air Quality Standards and Prevention of Significant Deterioration provisions that air quality will not deteriorate beyond standards. Regulatory agencies cannot issue permits resulting in air quality violations, and BLM lessees cannot conduct their activities in violation of air quality standards or related plans of implementation. A maturing tar sand industry would, therefore, tend to increase the competition for existing consumable air resource increments and might preclude some future industrial developments.

Because adverse impacts to wildlife in the STSA would occur throughout the life of the projects, the proposed actions would cause a long-term decline in wildlife populations.

Developing the proposed conversion areas would establish an all-weather road system throughout the main block with associated potential for recreation-related damage to wildlife and to cultural and paleontological resources.

Dispersed recreation opportunities in the STSA would shift from semi-primitive to semi-urban experiences. Hunting opportunities and the quality of hunting experiences would diminish. Positive trends would involve new and different sightseeing opportunities offered by an expanded road system, which would include opportunities to witness tar sand development.

4.D.2 Benefits and Trade-Offs

Table 4-2 presents an overview of the benefits and trade-offs of the proposed tar sand development. Direct quantification of the trade-offs is not possible for all resources. A review of Table 4-2 shows the items and resources that would increase in quality or quantity (generally considered to be beneficial) and those that would decrease in quality or quantity (generally considered to be exchanged to achieve the benefits).

4.D.3 Commitment of Resources

Implementing the proposed actions or alternatives would result in commitments to use the area more intensively and would significantly alter resource uses. The use and consumption of land and resources would be irreversible (once initiated, use and impacts would continue and could not be reversed for a long time, if at all) or irretrievable (irrecoverable for a long period of time or permanently). Some commitments would be both irreversible and irretrievable. Should federal land be authorized for use by the proposed projects, some resources would be committed for the short term until certain renewable resources could be reestablished. Other resources would be committed for the long term, after which resources would return to prior use or conditions.

Table 4-3 shows the irreversible and irretrievable commitment of resources that would result from implementing the proposed actions or alternatives.

TABLE 4-2
BENEFITS AND TRADE-OFFS

Resource/Item	Probable Increase	Probable Decrease	Variable
Oil Energy Production	X		
Tar Sand Resources[a]		X	
Tar Sand Reserves[b]			X[c]
Employment Opportunities	X		
Income Levels	X		
Local Prices and Wages	X		
Service Infrastructure	X[d]		
Public Revenues[d]	X		
Quality of Life			X[d,e]
Air Quality			
Quality as related to NAAQS		X	
PSD Increment Availability		X	
Visibility		X	
Water Quality		X[i]	
Water Quantity		X[i]	
Vegetative Production			X[g]
Soil Productivity			X[g]
Wildlife Populations		X	
Agriculture			X[g]
Transportation Network Use	X		
Road Quality			X[d]
Recreation Resource Use	X		
Dispersed Recreation Resource Quality[f]		X	
Wilderness Quality		X	
Cultural Resources		X	
Visual Resources		X	
Paleontological Resources		X[h]	

[a]Tar sand resources refers to the total quantity of minerals in the ground, as defined within specified limits.

[b]Tar sand reserves refers to the resources with known location, quantity and quality, which are economically recoverable through present technology.

[c]Knowledge of reserves could increase or decrease depending on information derived from mining and on-going exploration, and on the use of reserves through development.

[d]Most indicators commonly used to describe this resource/item would be likely to improve with proper planning and use of project-generated revenues, but likely would deteriorate in the absence of such measures.

[e]Quality of life is dependent on the viewers perspective and values. For example, while certain aspects of life quality could increase because of the increased income and infrastructure, other aspects would decrease because of decreased natural resource or increased population, all caused by the same development.

[f]Dispersed refers to undeveloped sites used for camping and informal day-use activities (i.e., floatboating, hiking, fishing).

[g]Productivity could generally improve with successful soil reconstruction and reclamation. Adverse conditions such as severe climatic conditions and lack of successful reclamation would cause a decrease in productivity.

[h]Resources could decrease; however, the understanding of the depositional environment could increase.

[i]Use of a significant portion of purchased or leased irrigation water would reduce salinity in and not deplete the Colorado River system.

TABLE 4-3
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resource	Commitment Irreversible	Commitment Irretrievable	Relationship of Short-Term Use of Environment and Long-Term Productivity
Water	Yes/No	Yes/No	Mining could reduce or deteriorate the watersheds. After reclamation, they may or may not return to pre-mining productivity. During mining, springs would be lost due to removal of the strata that supplies them. After reclamation, they may or may not emerge in the same area.
Socioeconomics	Yes	No	A change to a more impersonal and segmented social structure and to increasingly urban values would probably be irreversible, but not totally irretrievable.
Vegetation	No	Yes	Vegetation would be restored to a productive condition for grazing and long-term productivity. Diversity of vegetative types would be lost in areas where changes in topography have affected localized microclimatic conditions.
Soils	No	Yes	Increased erosion would gradually return to normal rates, as revegetation and soil stabilization would take place. Long-term productivity would not be impaired.
Wildlife	No	Yes	Short-term decreases in local populations of small mammals and birds could occur. Direct mortality to small mammals would occur during surface mining. Long-term productivity could be impaired due to topography changes.
Recreation	No	Yes	Semi-primitive dispersed recreation experiences would shift irretrievably to more of a semi-urban dispersed recreation experience due to new paved roads, a change in landscape, and general development within the area. Recreationists desiring semi-primitive dispersed recreation experiences would shift irretrievably to nearby BLM, National Forest, state and private lands, and the Uintah and Ouray Indian Reservation where similar experiences could be found.
Minerals	Yes	Yes	Tar sand production would help meet the national goal to reduce dependence on foreign oil as set forth in the Energy Security Act (Public Law 96-294). The production of tar sand oil, however, would use only 74 percent of the available resource in the STSA, and the remaining 26 percent would probably be irretrievable.
Visual	Yes	Yes	Some visual resource impacts would remain for the life of the projects or longer. Removal of physical structures and revegetation would return portions of the landscape to original conditions in the long term, but major landform modifications would remain into the long-term future.

TABLE 4-3 (Concluded)
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resource	Commitment Irreversible	Commitment Irretrievable	Relationship of Short-Term Use of Environment and Long-Term Productivity
Transportation Networks	Yes	Yes	Traffic accidents caused by increased traffic within the study area would increase. Time lost due to reduced traffic flow on area roadways resulting from project-induced increases in traffic volume would occur.
Grazing	No	Yes	Loss of forage production due to land disturbance would be a short-term impact for 4 to 5 grazing seasons. However, mining operations would cause disruption of grazing patterns and grazing access to adjoining areas creating a long-term grazing impact in certain areas.
Cultural	Yes	Yes	Implementation of the proposed projects would involve an irretrievable commitment of archaeological values to exploration and investigation under current technical procedures. Once destroyed, these values would not be available for future study. Salvage sites could not be studied with more advanced technological methods that might be developed in the future. Increased population levels would exert additional pressure on these resources, resulting in overuse and destruction. The total number of sites that could be affected is unknown.
Paleontology	Yes	Yes	Destruction of paleontological resources would be an irreversible permanent commitment of the resources.

Note: For specifics on the units of these resources that would be affected by the proposed actions and alternatives, see Chapter 2 or the appropriate resources sections in Chapter 3.

CHAPTER 5

COMMENTS AND RESPONSES

CHAPTER 5
COMMENTS AND RESPONSES

The Bureau of Land Management (BLM) consulted with many governmental agencies, private organizations, and individuals during the development of the draft and final environmental impact statement (EISs). Private citizens, organizations and other government agencies were involved at two stages: the scoping process and the draft EIS review. A public scoping meeting was held in Price, Utah on March 9, 1983. This method involved citizens and groups in identifying significant issues that should be addressed in the EIS. (See Appendix A-1, Consultation and Coordination, for a discussion of scoping concerns and questions.) A public hearing was also held in Price, Utah, in December 1983 to allow interested citizens and groups to publicly express their comments on the adequacy of the draft EIS. In addition, written comments were solicited during a 90-day public review period (November 3, 1983 to February 6, 1984).

BLM considered written comments and the oral testimony from the public hearings in preparing this final EIS and responds to these comments in this chapter.

Federal decisions on the synfuel project conversion applications will not be made until at least 30 days after the Environmental Protection Agency (EPA) Final EIS Notice of Availability has appeared in the *Federal Register*. During that 30-day period, written comments on the final EIS may be submitted to be considered in the decision making process.

Persons and groups from whom oral and written comments were received are listed on Table 5-1. Following this listing is a copy of substantive comments made at public hearings that were not duplicated in a follow-up letter and all comment letters received. (Copies of the complete public hearing transcripts and attendance lists may be reviewed by the public at BLM offices in Salt Lake City, Moab, and Price, Utah.) Responses to the comments appear after each testimony comment or comment letter.

TABLE 5-1
Public Hearing Testimony and Comment Letters

Reference Number	Speaker/Author	Representing
		Public Hearing Testimony
H-1	Lee Johnson	CEU
H-2	Jerry Mallett	Self
H-3	Rue Ware	Emery County Commission
		Comment Letters
1	Darrel V. Leamaster	Castle Valley Special Service District
2	Wilson G. Martin	Utah State Historical Society
3	Gayle J. Smith	Utah Department of Health
4	E.W. McIntire	U.S. Department of Health and Human Services, Region VIII
5	Robert J. Matuschek	U.S. Department of Housing and Urban Development, Region VIII
6	Granville Dutton	Sabine Corporation

TABLE 5-1—Continued
Public Hearing Testimony and Comment Letters

Reference Number	Speaker/Author	Representing
		Comment Letters—Continued
7	Reed C. Christensen	USDA Forest Service, Manti-LaSal National Forest
8	Dee L. Holladay	Holiday River Expeditions, Inc.
9	Joseph V. Greno	Outlaw River Expeditions
10	Ron Buchan	Adventure Bound, Inc.
11	Jerry Mallett	Western River Guides Association, Inc.
12	Frank S. Allison	U.S. Department of Transportation, Region 8
13	Joyce M. Wood	U.S. Department of Commerce, National Oceanic and Atmospheric Administration
14	Jerald Stanton	Emery County Chamber of Commerce
15	Owen Severance	Self
16	Thomas J. Messenger	Self
17	George C. Weddell	U.S. Army Corps of Engineers Sacramento, California
18	Bill Belknap	Fastwater Expeditions
19	Carol B. Whitmoyer	Boulder Animal Hospital
20	Joan Bacon Schindler	Professional River Guide
21	Loie Evans	Self
22	Robert D. Jacobsen	USDI Fish and Wildlife Service Colorado-Utah Area Office
23	Frank S. Lisella	Department of Health and Human Services, Public Health Service, Center for Disease Control, Atlanta, Georgia
24	Regional Director	USDI Bureau of Reclamation, Upper Colorado Regional Office
25	George Nickas	Slickrock Outdoor Society
26	Francis T. Holt	USDA Soil Conservation Service
27	Brian Kamm	Utah Wilderness Association
28	Richard A. Strait	USDI National Park Service, Rocky Mountain Regional Office

TABLE 5-1—(Concluded)
Public Hearing Testimony and Comment Letters

Reference Number	Speaker/Author	Representing
		Comment Letters—Continued
29	Heather Campbell	Self
30	Joyce T. Wood	U.S. Department of Commerce
31	Kevin Golic	Anderson "Western Colorado" Camps, Ltd.
32	Lewis M. Cook	Chevron Resources Company
33	Wayne R. Gould	Mono Power Company
34	Jack Swenson	Rocky Mountain Oil and Gas Association, Inc.
35	J. S. Tixier	USDA Forest Service, Intermountain Region
36	Mark L. Griffith	Western Adventure Safaris, Inc.
37	Sheri Griffith	Sheri Griffith River Expeditions
38	D.W. Robinson	Standard Oil Company (Indiana)
39	Helen D. Robison	The Humane Society of Utah
40	Al R. Jones	USDI Bureau of Reclamation, Engineering and Research Center
41	Scott M. Matheson	State of Utah, Office of the Governor
42	D. Floyd Wopsock	Ute Indian Tribe, Uintah and Ouray Agency
43	John G. Welles	U.S. Environmental Protection Agency, Region

PUBLIC HEARING COMMENTS

Because some comments presented at the public hearing in Price, Utah were duplicated by follow-up letters from speakers, the following section responds only to those comments that were not duplicated. The comments are directly quoted from the public hearing transcript.

<u>Comments From Lee Johnson</u>

<u>COMMENT H-1-1</u>: I have a great deal of concern about the water issue involved in this project. It seems that there is a great deal of specificity missing in the report as to what particular water sources would be used, how that water would be obtained, any kinds of damming, and piping of water.

<u>RESPONSE</u>: No dams are proposed by any of the project proponents. Offstream pumping stations are now proposed, but exact locations of these facilities and the associated pipeline route are not known. Water sources are described in Section 3.A.1, Water Resources, and listed in Table 1-7.

<u>COMMENT H-1-2</u>: Two specific companies, the Sabine and the Mono Company, have indicated that they would use Green River water. Throughout the entire stretch bordering this project the area is locked in at the present time as a wilderness study area.

A short while back, Sabine made a request to the BLM to pipe water to the Flat Canyon area. This proposal was contested. I believe their offer was then renewed. Eventually they dropped it, and in the document there is no specific comment as to how that water would be removed from the Green River, now in the new proposal, with either of the companies.

It would seem rather difficult for them to draft water any way from the Green River without penetrating that wilderness area, jeopardizing what could possibly be the single largest BLM wilderness in the state. It seems to place that wilderness area in deep jeopardy and also the possibility for wild to scenic.

<u>RESPONSE</u>: The Sunnyside EIS is nonspecific in analyzing impacts on recreation and wilderness resources related to use of the Green River because the exact locations of developments along the river corridor are not known. The point of withdrawal could be located near the town of Green River, Utah, or even upstream from the WSA. To avoid conflicts, BLM's wilderness policy does not allow degradation of WSAs. Therefore, no pipeline route would be allowed to degrade the wilderness character of the WSA. Once sites are selected, further environmental assessment and detailed plans of operations would be required.

<u>Comments From Jerry Mallett</u>

<u>COMMENT H-2-1</u>: I think initially our concerns are: and because we are an industry, we had about 35,000 recreation days down there last year. That converts to about a $10 million economic resource to our industry and to the local and state economy. This is an important resource that wasn't addressed, and we hoped that that would have some recognition in the EIS during the final.

<u>RESPONSE</u>: The Socioeconomic and Recreation sections (3.A.2 and 3.5.A) have been changed to address these issues.

<u>COMMENT H-2-2</u>: In your brief comments this evening you mentioned that we're looking at not more than 6,500 acres at one time that would be--and these would be rehabilitated--and I'd have to question that. I'd have to question what that life--if we're not going to be able to return wildlife habitat within up to 100 years, this rehabilitation is not going to happen in a very short order.

<u>RESPONSE</u>: Grasses and forbs are expected to be established within 3 to 5 years. More time, however, will be needed to adequately establish other types of vegetation, such as shrubs and trees, which are identified in Section 3.A.3, Soils and Vegetation. These estimates are based on research results and experience.

<u>COMMENT H-2-3</u>: And, again, coming from Colorado I've dealt with public land issues for some 20 years and seen what the energy development can have: a severe impact socially, economically, and very definitely visually on a community and a state.

We think that maybe the EIS is not addressing these and also not providing alternatives in mitigation. Mitigation: it states that resources and losses will be mitigated, but it doesn't go into detail how this would be accomplished.

<u>RESPONSE</u>: Socioeconomic and visual impacts of the proposed projects are addressed in Chapter 3 under these headings. Mitigation measures noted in the EIS are guidelines for the federal agency having jurisdiction over the affected area. The authorized officer of the federal land management agency will spell out the needed stipulations to accomplish the mitigation in preparing the lease and notice to proceed for the project. The EIS is not structured to give these details.

<u>Comments From Rue Ware</u>

<u>COMMENT H-3-1</u>: We do want to go on record as the Emery Planning Commission of supporting the development of the tar sands. We would like to see the tar sands used; we would like to see the increase in the economy that it would bring into our area; and we think it would be a real benefit to our people.

<u>RESPONSE</u>: Thank you for your comments. Your views will be considered in the decision making process.

Comment Letter 1

CASTLE VALLEY SPECIAL SERVICE DISTRICT

P. O. BOX 877
CASTLE DALE, UTAH 84513
TELEPHONE 801/748-5333

GALE CHAPMAN
Chairman
DARREL V. LEAMASTER
Manager

November 22, 1983

Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, Utah 84532

ATTN: Gene Nodine, District Manager

RE: Comments on the Sunnyside Combined
Hydrocarbon Lease Conversion Draft E.I.S.

Dear Mr Nodine:

We have reviewed the Draft Enviornmental Impact Statement for the Sunnyside Combined Hydrocarbon Lease Conversion and have found many incorrect statements regarding the water and sewer system capacities for the communities in Western Emery County. We would like to have these items corrected in the final EIS.

1-1

The Castle Valley Special Service District was organized to provide water and sewer services for seven (7) communities in Western Emery County. These communities are Emery, Ferron, Castle Dale, Orangeville, Huntington, Cleveland and Elmo. Since 1972 these communites and the Castle Valley Special Service District have spent over 17 million dollars in improvements to their systems. Many of these expenditures have just been completed within the last year. Probably your information was not current because of the recent expansion we have achieved.

Presented below are two tables, one showing the capacity of the culinary water system and one showing the capacity of the sewer systems for these communities. (Note that Greenriver is not inculded in our District)

CULINARY WATER SUPPLY SYSTEMS

Community	Present Connections	Present Water System Capacity	Present Excess Capacity (Conn)
Ferron	537	1,800	1,263
Orangeville	452	1,380	928
Castle Dale	692	1,800	1,108
Emery	150	360	210
Huntington & Clev & Elmo	1,050	2,300	1,250
Totals	2,881	7,640	4,759

Gene Nodine
Comments on EIS Draft
November 22, 1983
Page 2

SEWAGE TREATMENT SYSTEMS

Community	1980 Census Population	Present Sewer System Capacity Population	Present Capacity Excess + Shortage (-)
Huntington	2,303	3,000	+ 697
Castle Dale & Orangeville	3,220	7,000	+ 3,780
Ferron	1,713	800	(- 913)
Emery	372	1,300	+ 928
Cleveland	524	1,400	+ 876
Elmo	300	700	+ 400
Totals	8,432	14,200	+ 5,768

It is apparent from the above information that adequate water facilities are already available to meet the projected year 2005 population increases for Emery County. Note that historically we have averaged about 3.25 people per water connection. Our present excess capacity for water connections, thus represents 15,467 additional people and exceeds the projected needs. Our total water systems capacity will service 24,830 people.

1-2

The sewage treatment systems also have excess capacity in every town except Ferron. The present facility in Ferron is overloaded. However, a construction project is planned to begin in 1984 and be completed in 1985 that would add an excess capacity of 1,422 people. At the time of completion of the Ferron project we estimate the District will have an excess sewage treatment capacity of about 7,100 people. The total sewage treatment capacity would be 16,500 people.

To these stated excess capacities you must also add a factor for the low occupancy rates of many of our existing dwellings. At the present time many existing homes are empty. These connections are available for immediate use.

The above information clearly points out that excess connections are available in Emery County. We request that the EIS be revised on pages 3-17, 3-79 and 3-103 to reflect the current and accurate information.

We believe that the taxpayers and general population of the District would welcome the additional growth and development this project would bring. Additional growth would increase the number of users on the water and sewer systems and would lessen the re-payment burden on the existing system users.

Gene Nodine
Comments on EIS Draft
November 22, 1983
Page 3

We will not be able to attend the public hearing but would request that this letter be considered as part of the hearing record.

Very truly yours,

Darrel V. Leamaster, P. E.
District Manager

RESPONSES TO COMMENT LETTER 1

1-1, 1-2 We appreciate the additional data and have changed Section 3.A.2, Socioeconomics, water systems, to reflect this data. The conclusions stated in the text under sewer systems, however, still appear to be valid.

Comment Letter 2

SCOTT M. MATHESON
GOVERNOR

STATE OF UTAH
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT

Division of State History
(UTAH STATE HISTORICAL SOCIETY)

MELVIN T. SMITH, DIRECTOR
300 RIO GRANDE
SALT LAKE CITY, UTAH 84101-1182
TELEPHONE 801/533-5755

November 22, 1983

Gene Nodine
District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, Utah 84532

RE: Draft EIS, Sunnyside Tar Sand Area

Dear Mr. Nodine:

The Utah Preservation Office has received for consideration a copy of the draft EIS on the proposed conversion of existing oil and gas leases within the Sunnyside Special Tar Sand Area. After review of the material provided in the draft environmental impact statement, our office notes that the material on cultural resources is an adequate assessment of known material. Specifically the sections that address secondary impact are well thought out concerning both historic and cultural resources.

2-1 Our only note is a request for a technical change, on page 3-64, the SHPO's role should be changed to read "in consultation with the federal agency". The reason for this is the Utah Preservation Office takes no regulatory stand on federal management of their cultural resource responsibilities, but acts as a consulting agency as outlined by 36 CFR 800.5.

The above is provided on request as information or assistance. We make no regulatory requirement, since that responsibility rests with the federal agency official. However, if you have questions or need additional assistance, please let us know. Contact Jim Dykman at 533-7039.

Sincerely,

Wilson G. Martin
Deputy State Historic
Preservation Officer

JLD:jrc:G628/7493c

State History Board: Milton C. Abrams, Chairman • Theron H. Luke • Anand A. Yang • Elizabeth Montague • Thomas G. Alexander
J. Eldon Dorman • Wayne K. Hinton • Helen Z. Papanikolas • Davis S. Monson • Elizabeth Griffith • William D. Owens

RESPONSE TO COMMENT LETTER 2

2-1 The comment that appeared on page 3-64 of the draft EIS has been changed to reflect this concern.

Comment Letter 3

Scott M. Matheson
Governor

STATE OF UTAH
DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

Kenneth Lee Alkema, Director
Room 474 801-533-6121

James O. Mason, M.D., Dr.P.H.
Executive Director
801-533-6111

DIVISIONS
Community Health Services
Environmental Health
Family Health Services
Health Care Financing

OFFICES
Administrative Services
Community Health Nursing
Management Planning
Medical Examiner
State Health Laboratory

November 30, 1983

Mr. Gene Nodine, District Manager
Bureau of Land Management
P. O. Box 970
Moab, Utah 84532

Re: Sunnyside Combined Hydrocarbon
Lease Conversion

Dear Mr. Nodine:

As this agency has been delegated the responsibility of administering the associated regulations and policies related to public drinking water supplies, we reviewed the draft EIS on the referenced subject. It appears, as the report indicates in general terms, there exists a large potential for major impacts to both existing and future drinking water supplies in the area. Therefore, the following comments outline certain aspects which we feel needs further consideration in the final EIS.

3-1 1. Currently the communities of East Carbon and Sunnyside are undertaking the construction of a new culinary water treatment plant. These facilities will provide the required treatment of the surface waters drained into Grassy Trail Reservoir and will continue to be the sole source of supply. These facilities have been designed to treat water of a reasonably high quality. Any reduction in this quality would partially, if not completely, render the facilities ineffective. Due to the current economic situation in these communities, it would be almost impossible for them to rectify the impacts or handle the increased financial burden from any increased O & M costs.

3-2 2. While many different mitigating or preventive measures can be proposed to eliminate the impacts to water quality, we seriously doubt that such concentrated mining activities could be undertaken on the watersheds without serious effects. Not only would these activities lessen the water quality in terms of the obvious parameters, it now opens up the possibilities of chemical spills and other related similar accidental disasters.

An Equal Opportunity Employer

Mr. Gene Nodine =2= November 30, 1983

3-3 3. In assessing the minimum firm yield of Grassy Trail watershed as a drinking supply, it was learned that there would be critical shortages during drought periods for even the existing population. Therefore, any proposed additional needs from anticipated growth or mining activities would only increase these shortages. This problem would be magnified if water pollution control techniques reduce runoff.

3-4 4. The degradation of water quality and the associated impacts needs to be evaluated through an annual time frame to determine the most critical problems. An example of such a problem would be the concentration of pollutants during low flow summer and fall periods compared to the times when there are larger runoff flows for dilution.

3-5 5. The report indicates Range Creek drainages are not currently being used as a drinking water source, but they are considered for future use. We feel that if there is to be any population growth in the area (maybe resulting from the tar sands mining activities), these waters should be protected with as high a priority as those of Grassy Trail, since Range Creek appears to be the next most cost effective source with sufficient quality for culinary water use.

3-6 Therefore, with the above comments in mind it is our recommendation that any activities in the two referenced watershed areas be severely restricted if not totally prohibited. Of the different alternatives proposed in the report, the "Partial Conversion" alternative approaches our recommendation the closest. However, we feel there is still insufficient consideration given for the future needs of reasonably priced culinary water to support the increased demand from any population growth.

Sincerely,

Gayle Smith

Gayle J. Smith, P. E., Director
Bureau of Public Water Supplies

LJM:cc

cc: East Carbon
Sunnyside
Dept. of Community & Economic Dev.
Division of Water Resources

RESPONSES TO COMMENT LETTER 3

3-1 The measures addressing mitigation of potential project-related impacts to Sunnyside and East Carbon's water resources were described on page 1-37 of the draft EIS.

The resulting economic impacts that would be imposed on the two communities would be covered in the financial impact statement required under Utah Code Annotated Section 63-51-10 (Supp. 1981) (also called Senate Bill 170). See Appendix A-4. The applicants and local governments would negotiate the mitigation of these impacts during the permitting process. Potential alteration of the hydrologic regime and its effects on Grassy Trail Reservoir are presented in Section 3.A.1, Water Resources.

3-2 The impacts to water resources are described in Chapter 3 at the detail allowed by existing data. Chapter 1 states that a decision to convert a lease would require more detailed environmental analysis, which would be based on more defined project designs and more base data.

Although any development opens up possibilities for chemical spills, none of the applicants have proposed the use of any hazardous chemicals that could cause a disaster.

3-3 As stated in the response to comments 3-1 and 3-2, potential project-related impacts have been identified.

3-4 See responses to comments 3-1 and 3-2.

3-5 The operations proposed in the Range Creek watershed would occur in the Sunnyside Water Supply Reserve. If a decision is made to convert this part of the lease, the conversion would be subject to special conditions, including the approval of the Secretary of the Interior and the town of Sunnyside. See Section 4-A, Site Specific Mitigation and response to comment 3-1.

3-6 See response to comment 3-1.

Comment Letter 4

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the
Regional Director

Region VIII
Federal Office Building
1961 Stout Street
Denver CO 80294

December 12, 1983

Mr. Gene NoDine, District Manager
Bureau Of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Mr. NoDine:

4-1 As discussed in this Draft Environmental Impact Statement for Sunnyside Combined Hydrocarbon Lease Conversion, an influx of several thousand workers into the affected Utah counties by 2005 would place demands on local governments exceeding their present capacities. For example, the "partial conversion" alternative would require an additional 26 social workers in the affected counties. In this instance, future availability of public funds to support increased staffing is very uncertain.

The DEIS describes a number of proposed "uncommitted" mitigation measures, including funding for social worker positions by the applicant energy companies. We suggest that firm commitments from these applicants be sought.

Sincerely yours,

E. W. McIntire
Director, ROFEC

RESPONSE TO COMMENT LETTER 4

4-1 Although the socioeconomic actions suggested under uncommitted mitigation would require the approval and participation of local governments, assistance in their funding could be negotiated witb the applicants. Providing such assistance, wbere needed, is one of the purposes of Utah Code Annotated Section 63-51-10 (Supp. 1981), also known as Senate Bill 170

This suggested mitigation should be designed to supplement, not compete with, local business. Such measures would be implemented only when local business cannot contract the needed facilities or provide the needed services within a reasonable time.

Comment Letter 5

REC'D. MDO DEC 16 '83

U.S. Department of Housing and Urban Development
Denver Regional/Area Office, Region VIII
Executive Tower
1405 Curtis Street
Denver, Colorado 80202

December 13, 1983

Mr. Gene Nodine
District Manager
Bureau of Land Management
125 West 200 South
Moab, UT 84532

Dear Mr. Nodine:

Thank you for the opportunity to review and comment on the Sunnyside Combined Hydrocarbon Lease Conversion Draft Environmental Impact Statement.

5-1 Your draft has been reviewed with specific consideration for the areas of responsibility assigned to the Department of Housing and Urban Development. This review considered the proposal's compatibility with local and regional comprehensive planning and impacts on urban areas. Within these parameters, we find this document adequate for our purposes.

If you have any questions regarding these comments, please contact Mr. Howard S. Kutzer of my staff, at (303) 837-3102.

Sincerely,

Robert J. Matuschek
Director
Office of Community Planning
and Development, 8C

RESPONSE TO COMMENT LETTER 5

5-1 The views expressed in this letter will be considered in the decision making process. BLM appreciates the assessment that the EIS is adequate for the needs of the U.S. Department of Housing and Urban Development.

Comment Letter 6

SABINE

SABINE CORPORATION
1200 Mercantile Bank Bldg. Dallas, Texas 75201 (214) 741-1501

Granville Dutton
Vice President - Production

December 14, 1983

Mr. Gene Nodine
District Manager
Bureau of Land Management
125 West 200 South
Post Office Box 970
Moab, Utah 84532

Dear Mr. Nodine:

We do not understand why the Sunnyside Combined Hydrocarbon Lease Conversion Draft Environmental Impact Statement (EIS) of November 13, continues a misstatement of fact that Sabine corrected in our review comments on the Preliminary Draft on July 1, 1983.

Again, we refer to the language appearing in the summary under Unitization on pages 5 and 6 that "none of the applicants have gone any further than agreeing to discuss unitization at a later date."

6-1 Our comment on July 1 was as follows: "Sabine Corporation has gone much further than 'agreeing to talk about unitization at a later date'. In addition to filing a Unit Agreement with our application for conversion, we have circulated such agreements to all major conversion applicants, all working interest owners in our Sunnyside Tar Sand Unit and the State of Utah as well as calling three meetings of owners to discuss unitization. Although all other operators seeking conversion are willing to talk 'at a later date', none seem willing to plan an effective unit now."

Since then we have proceeded with the Sunnyside Tar Sand Unit consisting of 46, 863 acres on the east and north sides of the deposit. Our application for State of Utah approval is scheduled to be heard by the State of Utah, Division State Lands and Forestry on January 12, 1984.

We respectfully request that the incorrect statement be corrected for the final EIS.

Sincerely,

Granville Dutton

Granville Dutton

GD:klh

RESPONSE TO COMMENT LETTER 6

6-1 The Summary has been revised to properly reflect all progress to date on a unitized agreement.

Comment Letter 7

United States Department of Agriculture
Forest Service
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Reply to: 2820

Date: December 16, 1983

Mr. Gene Nodine
B.L.M. - Moab District
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

We received a copy of the Draft Environmental Impact Statement, Sunnyside Combined Hydrocarbon Lease Conversion, on November 10, 1983, and appreciate the opportunity to review and comment.

7-1 This program does not involve lands within or directly adjacent to the Manti-LaSal National Forest, therefore, it should not directly affect lands that we administer. We have no comment to offer.

Sincerely,

for
REED C. CHRISTENSEN
Forest Supervisor

FS-6200-11b (7/81)

RESPONSE TO COMMENT LETTER 7

7-1 Thank you for your review.

Comment Letter 8

Holiday
River
Expeditions
Inc.

Dee or Sue
Holladay

December 16, 1983

BLM District Office
Box 970
Moab, UT 84532

Gentlemen:

8-1 We oppose the granting of tar sands permits to existing oil and gas permit holders until tar sands are deemed practical.

We urge BLM not to commit the public lands in the book cliffs area to such a great impact untill or unless the need really exists.

Most sincerely,

Dee L Holladay
President

519 Malibu Drive
Salt Lake City, Utah
84107
801-266 2087

RESPONSE TO COMMENT LETTER 8

8-1 Thank you for your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 9

REC'D. MDO DEC 2 2 1983

12/20/83

OUTLAW RIVER EXPEDITIONS
P.O.BOX 790
MOAB, UTAH 84532
(801) 259-8241

Gene Nodine, District Manager
BLM
PO Box 970
Moab, Utah 84532

Re: Sunnyside Combined Hydrocarbon Lease Conversion
Draft Environmental Impact Statement

Dear Gene and the EIS Staff;

Thanks again for the opportunity to comment on the working of the BLM and the voluminous draft STSA-EIS. Again I sympathize with the task of the BLM in balencing utilization vs preservation of public lands. Let me state that I am NOT flatly opposed to development and energy exploration.

However, after review of the draft EIS, I must vehemently oppose the STSA as presented in this draft EIS, with the projected impacts on, just to name a few, surface water, air quality, wildlife, visual disturbance and the legal designation of Desolation Canyon as Wilderness. The EIS projects significant impact in these and other areas and thus would in consequence have a severe economic impact on our operations in the area.

9-1 I would like to compliment the companies in this proposed project in their planned attempts in the long-term reclaimation of the strip mined areas. They need to go a little farther and make better provisions for while-in-use impact. Damage to wilderness is often irreversible. I support the development of more cost-effective methods of energy fuel extraction perhaps along the "in-situ" solvent or steam extraction concept, where there is less significant surface impact. "Try again fellas, you'll make more money by moving less earth.." would be my advice.

9-2 We, of course, are specifically opposed to the diversion of water from the Green River, construction of dams or diversion devices, pollution of streams, rivers or air, impact on wildlife and interference with the designation of Desolation Canyon as a Wild and Scenic River.

To summarize, We are vehemently opposed to the STSA development.

Thank-you for the chance to comment. Your district has done a very good job of providing a defensable statement that documents the finding of significant and therefore unacceptable impact.

Sincerely,

Joseph V. Greno
President

- 1 -

RESPONSES TO COMMENT LETTER 9

9-1 The project description is still conceptual, and more provisions may be developed as the plans of operations are perfected.

9-2 Thank you for your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 10

REC'D. MDO DEC 2 3 1983

ADVENTURE BOUND, INC.

P.O. Box 125
Mack, CO 81525
Telephone: (303) 858-9079
Colorado Wats: 1-800-332-1400
USA Wats: 1-800-525-7084

WHITE WATER RIVER EXPEDITIONS

December 21, 1983

Bureau of Land Management
District Office - Moab
125 West 220 South
P.O. Box 970
Moab, UT 84532

Dear Sirs;

This letter is in reference to your environmental impact statement concerning the Sunnyside Combined Hydrocarbon Lease Conversion. Please include this letter as part of the official record.

I disapprove of the proposal reviewed in the impact statement. There is presently a lack of technology and a lack of specific timetables for the project. There exists no immediate need, nor a desire, for the product.

This indicates that the entire environmental impact statement was prepared just to convert, and thus renew, Bureau of Land Management leases.

10-1 Such a renewal is contrary to the spirit of the competitive bidding system. Leases should be allowed to expire. This will permit a fair market price on the land to be obtained later, when processing technology and market demand make recovery feasible.

Expiration of the lease also allows the area to be available for the most desirable use, whether that be a "wilderness designation," a "wild and scenic river designation" or whatever.

I wish to be on the record in support of the "no action" alternative. Thank you.

Yours truly,

Ron Buchan

Ron Buchan
Vice President
Adventure Bound, Inc.

cc: Jerry Mallett

RB/ir

RESPONSE TO COMMENT LETTER 10

10-1 BLM is considering the conversion of oil and gas leases to joint hydrocarbon leases as required by the Combined Hydrocarbon Leasing Act of 1981. This EIS was prepared to provide information to decision makers as they decide whether to allow conversion.

The views expressed in this letter will be considered in the decision making process.

Comment Letter 11

WESTERN RIVER GUIDES ASSOCIATION, INC. 4260 East Evans, Suite 8 Denver, Colorado 80222 303-758-5715

DICK LINFORD
president
GAYLORD STAVELEY
vice president
ART WOODWORTH
secretary-treasurer
JERRY MALLETT
executive director
WANN BROWN
PAT CONLEY
DON HATCH
directors at large

STATE CHAIRMEN

BOB LIPPMAN
Arizona
KEN BRUNGES
California
BILL DVORAK
Colorado
HANK MILLER
Idaho
CRAIG MADSEN
Montana
SHANE MURPHY
Nevada

DON STEVENS
Oregon
AL BROWN
Utah
PETE KARP
Washington
N. WAYNE JOHNSON
Wyoming
MARK JENSEN
Alaska

December 16, 1983

Bureau of Land Management
District Office
125 West 200 S
Box 970
Moab UT 84532

Dear Sirs:

Western River Guides Association has reviewed the Draft Environment Impact Statement regarding the Sunnyside Combined Hydro-Carbon Lease Conversion and would like to provide the following comments to be included in the official record hearing.

In 1983, 26 professional outfitting companies provided an excellent wild river adventure to nearly 1800 individuals. In addition, over 2860 private persons ran this outstanding whitewater river. This area contributes approximately 3.4 million dollars to Utah economy on an annual basis and is an important segment of the river running industry in Western United States.

The DEIS states that the river running industry is an important economic resource. It also mentions that the industry will be adversely effected by the proposed development of the five corporations. Unfortunately, the DEIS
11-1 does not state the overall impacts to the river or the present economic values and possible losses to the river industry.

In fact the major weakness of the DEIS is lack of factual reference to the
11-2 impacts and methods of operation of the proposal. The report states "Because very little is known about the location and extent of the resource project designs are conceptual." It is conceived that impacts will adversely effect
11-3 Bear, Rock, Range, and Flat Creeks and the contributing aquifer of the Green River.

11-4 It is obvious that technology will change within the coming years and any proposed development plans at that time will be outdated in the future.

The first step is developing the tar sands resource appears to make full utilization of these resources or private lands to demostrate the practicality of a feasible operation.

Bureau of Land Mangement
December 16, 1983
Page 2

The next stage will be a well planned start up on public lands. In view of the fact that this type of hydro-carbon development is extremely expensive and the current oil prices are fairly low, full development of hydro-carbons may be 40 to 50 years in the future, if ever.

In conclusion, WRGA recommends that these oil and gas leases not be converted to hydro-carbons until a private facility has been developed and proven operational. It is also critical that all impacts are sited prior to the lease of the tar sands resources. These will be identified in a private operation.

Sincerely,

Jerry Mallett

Jerry Mallett
Executive Director

JM:rmm

RESPONSES TO COMMENT LETTER 11

11-1 The recreation discussion in Section 3.A.2, Socioeconomics, has been changed with quantification based on BLM (1983b) data.

11-2, 11-3 Less than 160 acres would be disturbed in the Flat Creek watershed. Even if the watershed is mined, impacts to water resources would be insignificant and probably not even measurable.

The projects analyzed in the EIS are highly conceptual, and the impact analysis is based on existing data and many assumptions. Should a decision be made to convert a lease, more environmental analysis, based on more defined project designs, would be required before the types of commercial production discussed in the EIS would be permitted. Such analysis would be conducted as part of the ongoing mine-plan review and monitoring program. Although exact locations are unknown, the potential for impacts has been addressed.

Potential impacts to Rock and Bear creeks would result from deposition of spent sand near their drainage divides, but such deposition would probably not be noticeable at their mouths (draft EIS, page 3-6). Any impact on the contributory aquifers to the Green River would be limited to the main block of the Sunnyside STSA (draft EIS, page 3-2).

11-4 BLM recognizes that the final plans of operations may differ from those analyzed in this EIS. More analysis will be conducted as plans of operations are revised.

Comment Letter 12

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION EIGHT
555 ZANG STREET, BOX 25246
DENVER, COLORADO 80225

December 21, 1983

Mr. Gene Nodine, District Manager
U.S. Department of the Interior
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

IN REPLY REFER TO
HPP-08

Dear Mr. Nodine:

Thank you for the opportunity to review the Draft Environmental Impact Statement (EIS) concerning the Sunnyside Hydrocarbon Lease Conversion. We have the following comments:

12-1 1. Page 2-2, Comparative Analysis, Table 2-1
Under the heading "Transportation" and the subheading "Tonnage Transported (Million Gross Tons)," the words "Same as Proposed Action" are included in each box across the matrix; thus creating confusion. These entries should be reevaluated. At the very least, it would seem that there is a difference between the "No Action" alternative and the "Proposed Actions" alternative - if not among all the alternatives.

12-2 Additionally, the Comparative Analysis chart should show the comparison of additional traffic accidents projected under each alternative.

12-3 2. Pages 3-56, 3-88, and 3-110, Transportation Networks - In all three sections above - Proposed Actions, Partial Conversion, and Unitized Development - it is stated that there will be some sections of highway where the level of service will drop below the UDOT standard and that accident levels will be significant at future dates in the project. This EIS (not a construction, operation, and maintenance (COM) plan) should specify how the reduced level of service and the increased volume and accidents are to be mitigated.

12-4 3. Page 3-111, Unitized Development
There is an apparent conflict bewteen the first paragraph and the third to last paragraph. The first paragraph mentions twenty interrelated coal mines while the third to last paragraph discusses sixteen interrelated coal mines.

Sincerely yours,

F. S. Allison

Frank S. Allison
Director, Office of Planning and
Program Development

RESPONSES TO COMMENT LETTER 12

12-1 Table 2-1 has been changed in response to your comment.

12-2 Numbers of additional traffic accidents are not included in Table 2-1, Comparative Analysis. See Section 3.A.8, Transportation Networks, for the complete analysis of impacts. This analysis includes the estimated number of traffic accidents on each road by miles traveled, year, and increase in volume.

12-3 Section 4.A., Site-Specific Mitigation, has been revised to include mitigation to reduce traffic accidents on road segments that fall below level-of-service C.

12-4 The text in Section 3.C.8, Transportation Networks, has been changed to consistently state that there are 20 interrelated coal mines.

Comment Letter 13

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

December 22, 1983

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Sir/Madam:

This is in reference to your draft environmental impact statement on the Sunnyside Combined Hydrocarbon Lease Conversion. Enclosed are comments from the National Oceanic and Atmospheric Administration.

Thank you for giving us an opportunity to provide comments which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Joyce Wood

Joyce M. Wood
Chief
Ecology and Conservation Division

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Washington, D.C. 20230

N/MB2x5:VLS

DEC 22 1983

TO: PP2 - Joyce Wood

FROM: N - Paul M. Wolff

SUBJECT: DEIS 8311.14 - Sunnyside Combined Hydrocarbon Lease Conversion

The subject DEIS has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

13-1 Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. We recommend that funding for this project include the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Chief, National Geodetic Information Branch (N/CG17), or Mr. Charles Novak, Chief, Network Maintenance Section (N/CG162), at 6001 Executive Boulevard, Rockville, Maryland 20852.

RESPONSES TO COMMENT LETTER 13

13-1 Project proponents will be responsible for funding any needed relocation of geodetic control monuments. Land use mitigation measure 1 (Appendix A-3) requires immediate restoration of damaged land improvements.

Comment Letter 14

EMERY COUNTY CHAMBER OF COMMERCE

Emery County Chamber of Commerce
P.O. Box 156
Castle Dale, Utah 84513

December 29, 1983

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
Box 970
Moab, Utah 84532

Dear Mr. Nodine:

14-1 The Emery County Chamber of Commerce is strongly in favor of the development of the Sunnyside Special Tar Sand Project.

Because of the cyclical nature of the coal mining industry which the Carbon/Emery County area is so dependant upon, we need the Tar Sands project to help stabalize our economy.

We feel that the environment and environmental consequences are so minimal compared to the economic advantages that there should be no opposition to the development and implimentation of the project.

Sincerely,

Jerald Stanton

Jerald Stanton, President
Emery County Chamber of Commerce

JS/ew

RESPONSE TO COMMENT LETTER 14

14-1 Thank you for your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 15

January 3, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Management
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine,

I am submitting these comments on the "Sunnyside Combined Hydrocarbon Lease Conversion DEIS".

The BLM is to be commended for the excellent job of identifying the possible impacts of tar sands oil production in the Sunnyside STSA. Due to the massive irreversible impacts as identified by the BLM that can result from the lease conversions, the preferred alternative should obviously be the "No Action Alternative". The high cost of oil recovery from tar sands and the low percentage of the possible contribution of tar sands oil to our Nation's total oil consumption combined with the low world oil prices projected for the foreseeable future make the environmental impacts of tar sands recovery unacceptable. There are low impact ways, such as conservation, to easily make up for the small possible contribution of tar sands oil. Although it is not given in the DEIS, tar sands oil would
15-1 contribute less than 1% of our country's oil needs even at maximum development. Tar sands oil recovery should only be considered when mining and refining processes are economically feasible and can compete in the marketplace without subsidies and the recovery can be done in such a manner as to not destroy the environment.

Since the BLM doesn't consider the "No Action Alternative" to be feasible, the most realistic "Preferred Alternative" is a combination of the "Partial Conversion and Special Mitigation" and "Unitized Development" alternatives. This alternative should include:

A) Only one 50,000BPD processing plant located near Sunnyside.
B) No plant construction or spent sand disposal in VRM Class II or ClassIII areas.
15-2 C) No plant construction or spent sand disposal in the Range Creek drainage or the Right Fork of Grassy Trail Creek.
D) No lease conversions along Nine Mile Creek.
E) No lease conversions in the Desolation Canyon WSA or the Jack Canyon Appeal Area.
F) Restrictions on tar sands mining to reduce grazing, wildlife, visual resource and watershed impacts as outlined in the "Partial Conversion" alternative.

G) Exclude Public Water Reserve areas from lease conversions.
H) Require Best Available Control Technology to reduce impacts on Air Quality.
I) Require avoidance of all significant Cultural Resources and implement requirements to reduce Secondary Impacts on Cultural Resources.
J) Require a 100% cultural resource survey of all areas that will suffer Secondary Impacts such as Nine Mile Canyon.

15-2 (cont.) The BLM should not convert all 23 leases as suggested in the "BLM Preferred Alternative". The land in the STSA should be managed for Multiple Use and should not be turned over to private corporations as a sacrifice area to be destroyed as would happen if this alternative is used since the BLM cannot require rational development. A "Preferred Alternative" should be presented by the BLM that includes restrictions that protect the air quality, water resources, wildlife, cultural resources, recreation, and grazing that now exist in the area and leases should be converted only on those areas where irreversible impacts to these resources will not occur.

Sincerely,

Owen Severance

Owen Severance
P.O. Box 1015
Monticello, Utah
84535

1/4/84

RESPONSES TO COMMENT LETTER 15

15-1 Information on the proportion of the nation's needs provided by tar sand is presented in the EIS on Table 1-1 and in Section 1.A.2, Purpose and Need for Proposed Actions.

15-2 The partial conversion alternative and/or special mitigation is discussed in Section 1.D of the EIS. Items B, C, F, G, and H in your letter are covered in the constraining criteria discussion in Section 1.D. The impacts of a 50,000 bpd processing plant (item A in your letter) are analyzed in Section 1.E, Unitized Development Alternative.

No lease conversion applications have been submitted for areas in Nine Mile Canyon, Desolation Canyon, or Jack Canyon WSAs (items D and E in your letter).

The level of cultural resource inventories in the Sunnyside STSA will be specified as required stipulations when the plan of operations is submitted for approval. Cultural resource stipulations will be assessed on a project location basis. BLM cannot require cultural resource surveys on areas outside the STSA where secondary impacts are expected. The BLM-preferred alternative (unitized development) would disturb the least number of acres at one time, and the disturbance and reclamation would be easier to adjust over time. Even if all 23 leases are converted, only 43 percent of the STSA would be mined over a 94-year period. Any BLM-preferred alternative has to balance resource development with expected impacts, and an agreement to mitigate these impacts is required before the Notice to Proceed is issued.

Comment Letter 16

2900 South Glebe Road, #508
Arlington, Virginia 22206
1 January 1984

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, Utah 84532

Sir:

Your Sunnyside Combined Hydrocarbon Lease Conversion Draft Environmental Impact Statement convinces me that the proposed action, partial conversion alternative, and unitized development alternative all have unacceptable environmental consequences. Indeed, I think you should be developing a plan to protect the surrounding area from the effects of the Chevron-CNC development on private land.

Tar sand development would permanently disfigure a beautiful area for ephemeral gains.

16-1 On page S-2 in the first paragraph under socioeconomics you cite "beneficial impacts in the long term." I do not think the creation of Uravan or Cisco on a larger scale is a beneficial impact. The planned life of the projects is quite long, but the vulnerability of the one-industry towns would be considerable. You say current unemployement is due to the depressed state of the coal industry. What would make the tar sand industry more secure? How can the exploitation of a nonrenewable resource be considered a permanent source of livelihood?

16-2 You have not considered drying of the climate in the Colorado Basin by the greenhouse effect. Extraction and bitumen upgrading make more carbon dioxide to add to the problem. The consumption of the resulting petroleum adds more.

16-3 Processing and the added population will add demand while the supply of water decreases. Recovery of strip-mined areas would be slower in the more arid climate.

Sincerely,

Thomas Messenger

Thomas J. Messenger

RESPONSES TO COMMENT LETTER 16

16-1 As stated in the socioeconomic discussion in the Summary, the proposed development would have both beneficial and adverse effects. The provision of more jobs and income is generally considered beneficial. Adverse effects that would result from rapid growth are detailed in the socioeconomic sections of the EIS. Judgments will differ on whether population increases in area communities, resulting in improved shopping and other amenities but irreversibly changing the lifestyle, would be beneficial or adverse.

The tar sand industry would be no more secure from energy market cycles than would the coal industry, and the text has been expanded, in the Summary and in Chapter 4 to address the subject of increased local economic vulnerability. Although exploitation of a non-renewable resource is never a permanent economic activity, the planned life of the project would make it a long-term element in the lives of the employees and the communities.

16-2, 16-3 The contribution of the proposed action to a potential carbon dioxide (CO_2) build-up is small, given the global scale of the greenhouse effect. The air quality analysis concentrated on local-regional scale impacts from the criteria pollutants and any hazardous pollutants found in the emission inventory to be above EPA de minimus levels. The analysis was not intended to address impacts on a global scale, such as the greenhouse effect.

The CO_2 question is obscured by many unknowns and uncertainties that have stimulated studies of past climates, in particular, past warm periods. Studies suggest that appreciable decreases in precipitation and increases in temperature (and hence in evaporation) in bands of latitude at 40 degrees north and 10 degrees south are possible if the concentration of CO_2 rises into the range of 560 to 680 parts per million and if other infared-absorbing gases also become more abundant. Such a rise in CO_2 concentrations would dramatically decrease the average flow in the Colorado River Basin, possibly by 50 percent.

Climate changes resulting from CO_2 build-up or any other reason will not be events. They will be slow, pervasive environmental shifts, imperceptible to most people from year to year because of the annual range of climatic variation. If present energy use patterns continue, the CO_2 concentrations projected to create climate changes would not occur until 2050, well beyond the life of the proposed actions. Shifts in energy demand are also expected as developing countries (with 70 percent of the world's population) require more energy per person to raise their standards of living. Energy consumption in the developed countries is expected to decrease, resulting in a net energy use similar to present trends (2-3 percent increase per year).

CO_2 will be introduced to the atmosphere for a limited time simplybecause there are limited recoverable supplies of the CO_2-producing fuels (petroleum and natural gas) that produce two-thirds of the CO_2. The question of whether climatic change will take place is an appraisal that is extremely difficult to make with any certainty. The following factors are involved: changes in the output of the sun, changes in the reflectivity of the earth, and changes in the biota of the earth that influence the climate. Whether the CO_2 content of the atmosphere is great enough to be the dominant factor remains to be seen (Revelle 1982).

Comment Letter 17

C

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814
December 29, 1983

REPLY TO
ATTENTION OF
SPKED-W

Mr. Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

This is in response to your November 3, 1983, request for comments on the Sunnyside Combined Hydrocarbon Lease Conversion draft EIS. Your request for comments to our Corps of Engineers Washington headquarters has been referred to the Sacramento District for response.

17-1 Because of our regulatory jurisdiction under the Clean Water Act (33 USC 1344), we will be interested in receiving the site specific analyses when they become available. These analyses will assist us in determining whether particular actions will require an individual permit or whether they are covered under an existing nationwide permit.

The information discussing the Corps' regulatory program on page A-3-6 of the draft EIS only relates to our nationwide permit program. If an individual permit is required, it will be necessary for the applicant to apply for a permit as described in the attached information sheet. Further information concerning our regulatory program may be obtained by contacting Mr. Tom Skordal of our Salt Lake City Regulatory Office. His phone number and address are provided in the information sheet.

Sincerely,

Michael Bonner
George C. Weddell
Chief, Engineering Division

Enclosure

RESPONSE TO COMMENT LETTER 17

17-1 BLM appreciates your concern. Site-specific analyses will be furnished to you when they are completed. The required authorizing actions for amended plans will be included in those site-specific analyses.

Comment Letter 18

P. O. BOX 365 / BOULDER CITY, NEVADA 89005 / TELEPHONE (702) 293-1406

FASTWATER EXPEDITIONS

Division of Belknap Photographic Services, Inc.

3 January 1984

Gene Nodine, District Manager
Bureau of Land Management
Box 970
Moab UT 84532

Dear Mr. Nodine:

I'm deeply concerned about the possible loss to this and future generations of a truly magnificent wildlife habitat and multi-use resource if mining of the Sunnyside Tar Sands Area is allowed to proceed.

The following comments are based on my own observations over many years of the STSA, the adjacent Tavaputs Plateau and its canyons that drain into the Green River.

18-1 The elevation of the STSA and the Tavaputs Plateau varies from 7,000 to 10,000 feet. This elevation makes it one of the increasingly rare potential outdoor recreation areas that will remain relatively free of air pollution. Forests of evergreens and quaking aspens cover much of the area, bordering high country meadows that are carpeted with a great variety of wildflowers in the summer. Deer, bear, mountain lion, and many smaller animals as well as a wide variety of birds inhabit the area. There are many striking scenic views out over the Tavaputs Plateau and the surrounding country.

Range Creek and Rock Creek are -- and have been for many years -- outstanding trout fisheries. To alter the quality or temperature of the water in either drainage would destroy its fishery, and become yet another source of pollution to the Green River.

18-2 Because it is so remote and little known, if the prospective tar sands lessees are allowed to carry out their planned strip mining operations, this exquisite area would be irreparably damaged before the American public became aware of its loss.

The tar sands have been where they are for millions of years, and will still be there if they should ever be needed for a genuine national emergency. Let's not destroy forever the priceless aesthetic values of one of our nation's outstanding primitive areas for relatively short term financial gain.

In view of these observations I strongly urge the Bureau of Land Management to adopt the "no-action" alternative listed in the Sunnyside Combined Hydrocarbon Lease Conversion draft EIS, and to do everything in its power to

18-2 (cont.) facilitate favorable action on the three nearby areas under consideration for wilderness designation -- Turtle Canyon Wilderness Study Area, Desolation Canyon Wilderness Study Area, and Jack Creek Appeal Area.

Sincerely,

Bill Belknap

Bill Belknap

BB/ib

RESPONSES TO COMMENT LETTER 18

18-1 The resources mentioned in your comment are described in Chapter 3 of the EIS. Potential impacts to the trout fishery in Range Creek and Rock Creek were discussed with personnel of the Utah Division of Wildlife Resources and are detailed in Section 3.A.4. Wildlife.

18-2 BLM appreciates your comments. They will be considered in the decision making process.

Comment Letter 19

Boulder Animal Hospital
1252 Wyoming Street
Boulder City, Nevada 89005
(702) 293-3744

CAROL B. WHITMOYER, DVM

January 2, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Management
Box 97D
Moab, Utah, 84532

Dear Mr. Nodine:

The BLM should adopt the "No Action" alternative as outlined in the Sunnyside Combined Hydrocarbon Lease Conversion Draft EIS.

Opening the Sunnyside Tar Sand Area to massive mining operations would destroy some absolutely beautiful country, ruin two fishing streams; Rock Creek and Range Creek, and jeopardize Wild and Scenic designation for that area of the Green River. I would consider the loss of the beautiful country involved only in the case of a dire national emergency.

19-1 Chevron Oil Co. has an operation on private land which you cannot prohibit. Why not wait until they have proven they can do it economically and in an enviornmentally sound manner on their own land before letting them do it on land that belongs to all of us and which I personally would feel a greatloss.

I think you should also wait until action has been taken on three areas under review for Wilderness designation: Desolation Canyon Wilderness Study Area, Turtle Canyon WSA and Jack Creek Appeal Area.

Your No Action alternative will, at least temporarily, save some beautiful country. The tar sands deposits will still be there later, should our country ever need them badly enough to pay the price of losing these areas, and they will have a better idea later whether development is economicallysound.

Sincerely,

Carol B Whitmoyer DVM

Carol B. Whitmoyer, DVM

RESPONSE TO COMMENT LETTER 19

19-1 BLM appreciates your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 20

P. O. Box 584
Zephyr, Texas 76890
January 2, 1984

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

20-1 The BLM should adopt the NO ACTION ALTERNATIVE as outlined in the Sunnyside Combined Hydrocarbon Lease Conversion Environmental Impact Statement.

Opening the STSA to massive mining operations would destroy an outstanding primitive and multiple use area. Trout fishing would be annihilated in Range, Bear and Rock Creeks. Wildlife habitat and livestock grazing areas would be destroyed. Wild and Scenic designation for the Green River would be jeopardized.

The BLM should not allow development of any tar sand deposits in the STSA until:

1.) The Chevron operation on private land has proven to be economically viable and environmentally sound;

2.) Action has been taken on the three areas under review for wilderness designation (Turtle Canyon WSA, Desolation Canyon WSA, and Jack Canyon Appeal Area).

The tar sand deposits are not ephemeral. They will be available should our nation ever truly need to exploit such hydrocarbon deposits. Conversely, the primitive nature of the STSA can never be restored or recovered once it is disturbed.

Sincerely,

Joan Bacon Schindler

Joan Bacon Schindler
Professional River Guide

RESPONSE TO COMMENT LETTER 20

20-1 BLM appreciates your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 21

Loie Evans
28158 Shadow Mt. Rd., Conifer, Colorado 80433

Jan. 3, 1984

Gene Nodine, District Mgr.
Box 970
Moab, UT 84532

Dear Gene,

I feel strongly that the BLM should adopt a No-Action Alternative as outlined in the Sunnyside Combined Hydrocarbon Lease Conversion Draft EIS.

I am deeply concerned about the devastating impact a project like this would have on the Rock Creek, Range Creek and Desolation Canyon areas. I have spent years in these areas as an Outfitter and river

21-1 guide and know them to be a wilderness resource of great value. While river running right on the Green through Desolation Canyon might not be affected, the impact on the surrounding area to wildlife, fishing, and wilderness experience would be substantial.

A processing plant installed in Range Creek and utilizing virtually all the water from that creek, destroying valuable fishing and wildlife habitat would be unthinkable.

I would hope there are alternative energy solutions to be utilized before destroying what can **never** be replaced!

Sincerely
Loie Evans

RESPONSE TO COMMENT LETTER 21

21-1 BLM appreciates your comments. The views expressed in this letter will be considered in the decision making process.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138-1197

(ES) January 5, 1984

MEMORANDUM

TO: Gene Nodine, District Manager
Bureau of Land Management (BLM)
Moab, Utah

FROM: Field Supervisor
Ecological Services
Salt Lake City, Utah

SUBJECT: Review of the Draft Environmental Impact Statement (DEIS) for the Sunnyside Combined Hydrocarbon Lease Conversion

The Fish and Wildlife Service (FWS) has reviwed the DEIS and is concerned with several sections of the document. The criteria for "significant impacts to wildlife, site-specific plan of operations, site-specific wildlife data, human demographic and other cumulative impacts, and mitigation" should be readdressed before final decisions are made based on the Environmental Impact Statement (EIS).

I. Impact Significance Criteria

22-1 In Chapter 3 of the DEIS it is assumed that wildlife impacts are significant if greater than 10 percent of the "crucial" habitat is disturbed or affected. The FWS believes that any loss of "critical" or "crucial" habitat is, and should be, considered significant. This is particularly important when viewed cumulatively with the losses of "crucial" habitat resulting from other existing or planned developments on Federal and non-Federal lands in eastern Utah. The document should recognize the significance of these potential losses so they can be adequately addressed in the environmental consequences and appropriate mitigation sections.

II. Site-Specific Plan of Operations

22-2 The FWS is concerned that the non-specific details of the proposed plan of development do not provide adequate information to address impacts to fish and wildlife from the proposed lease conversions. The DEIS recognizes this problem in the summary under the section entitled "Unresolved Issues" (S-5). Impacts to endangered species and "crucial" wildlife habitat cannot be identified until development details are provided. As stated in the EIS, the applicants have submitted "conceptual plans for commercial mine and plant development" (I-19). Consequently, as the document acknowledges, "the impact analysis presented here is based on minimal data and numerous assumptions."

Data should be provided that explain details of the volume and location of water requirements for the projects and related tar sands development. This information will determine the detail and level of Fish and Wildlife Coordination Act report requirements for the proposed action.

III. Site-Specific Wildlife Data

22-3 It is acknowledged in the EIS that big game calving, fawning, and migration routes are unknown and raptor inventories have not been conducted for the area. Lease conversions may be premature without the data available. Conversions before inventories and studies to identify "crucial" habitats may result in unnecessary development delays, costly project alterations, or may prevent the assurance of protection for "crucial" habitat if not stipulated in the lease.

IV. Human Demographic and Cumulative Impacts

22-4 The discussion in the DEIS of human demographic and cumulative impacts from Sunnyside tar sands development is very limited in presenting the expected impacts to wildlife and recreational opportunities dependent upon wildlife resources (hunting, fishing, sight-seeing, camping, etc.). It is erroneous to discuss only those secondary impacts on the proposed development area. The impacts from human population growth resulting from tar sands development will be felt throughout eastern Utah. Those impacts will not be limited to the tar sands development area. Increased populations will demand more housing (urban acreage), water for culinary use, hunting and fishing opportunities, off road use, road development, road kills, poaching, hunter-landowner confrontations, and greater demands on LESS wildlife. These impacts should be recognized and accounted for. How much loss is acceptable? How will the increased demands be met and who will be responsible for assuring the availability of resources? Measures and responsibilities for implementing measures should be clearly defined and agreed upon as to how the fish and wildlife resources will be protected and enhanced to meet the increased demand.

22-5 Existing energy development (coal, oil, and gas) and planned tar sands development currently are creating cumulative human demographic impacts on a finite (wildlife habitat) resource. Population in Emery and Carbon Counties have increased 125% and 42% respectively from 1970 to 1980. According to BLM Coal and Tar Sands documents, by 1995 those counties can expect another 49,000 (high scenario) or 30,000 (low scenario) new residents, a 200% or 100% increase over the current population. Resource problems that would arise from population booms like these have been documented for coal areas in Wyoming. It can be assumed that similar impacts would occur in eastern Utah. The Sunnyside DEIS has not adequately addressed the significance of population growth and its cumulative impacts. We cannot discuss adequate mitigation and the cost for mitigation until the impacts are more clearly defined.

V. Mitigation

22-6 The mitigation measures described as enforceable (Appendix A-3) do not appear appropriate for combined hydrocarbon lease conversions. The measures presented were for oil and gas development, an activity that has minimal surface disturbance. Oil and gas development bears little resemblance to the proposed development of Sunnyside tar sands beyond the exploration stage. The BLM lease catagory designations for oil and gas leasing in the Book Cliffs Resource Area are not appropriate for strip mining. The proposed mitigation, contrary to what is stated in each measure (7-10), does not "reduce the impacts of the projects on sage grouse, deer, or elk."

22-7 In the "Uncommitted Mitigation" Section (Appendix 4), wildlife measures 7 and 8 should be deleted. Number 7 states the impacts, not the mitigation. The wildlife study descriptions in measure 8 do not constitute wildlife mitigation for lease conversions. These studies should be completed prior to leasing so special stipulations (mitigation) can be included in the lease to insure the protection of "crucial" habitats designated from the studies.

This concludes our comments on the DEIS. Additionl comments on endangered species will be provided in a separate memorandum from the FWS Endangered Species Team Leader. We appreciate the opportunity to participate in reviewing the document and will be pleased to provide further assistance. Should you have concerns or questions, please contact the Assistant Field Supervisor for Utah, Ecological Services, Salt Lake City or Jim Munson for specific details of our response.

Robert D. Jacobsen

RESPONSES TO COMMENT LETTER 22

22-1 The significance criterion in Section 3.A.4. Wildlife, has been changed from "10 percent" to "any" loss of critical habitat.

22-2 The exact point of withdrawal is not known because of the conceptual nature of the projects. Table 1-7, however, gives the source and the use in acre-feet per year. Should a decision be made to convert a lease, more environmental analysis based on more defined project designs would be required before commercial development would be permitted. Coordination Act requirements would be carried out at that time.

22-3 Without definite locations for project facilities, site-specific inventories for raptors and other wildlife could not be used in detail in the analysis. Stipulations for future inventories, consultation, and protection of wildlife are included in Appendix A-3 and would be included as stipulations for converted leases.

22-4, 22-5 A population increase due to the Sunnyside project would probably have recreation impacts scattered throughout eastern Utah, but this EIS analyzes only major and significant impacts to recreation. Impacts to hunting and fishing opportunities and off-road vehicle use affecting the quality of hunting and fishing would be most acute in Carbon County and less acute in surrounding counties in eastern Utah. (See Section 3.A.5. Recreation Resources.)

The secondary impacts are recognized as mentioned above. Increased demands on wildlife are ultimately the responsibility of the state wildlife management agency.

Impacts of human population growth caused by development of the Sunnyside STSA have been analyzed for Carbon and Emery counties, not just for the proposed development area. Determining this area of influence is described in Appendix A-6, Socioeconomics. Population-based impacts resulting from development of the other STSAs in eastern Utah are addressed generically in the Utah Combined Hydrocarbon Leasing Regional Final EIS (BLM 1984) and will be covered more fully in the specific EISs to be completed for each STSA.

The specific subjects mentioned are addressed in different sections of the EIS: Impacts to housing demand (urban acreage) are discussed under Section 3.A.9. Agriculture; culinary water requirements are covered under Section 3.A.2. Socioeconomics; and impacts on road systems are described under Section 3.A.8. Transportation Networks. For more specific information on mitigation of these impacts, See Section 4.A. Site-Specific Mitigation, and Appendices A-3 and A-4.

22-6 The oil and gas measures would apply only if drilling or in-situ production occurs.

If mining takes place, measures outlined in section 4.A and 4.B and Appendix A-4 would also apply. Special mitigation in Section 1.D will also be required where appropriate.

RESPONSES TO COMMENT LETTER 22 (Continued)

22-6 Cont. Appendix A-3, Required General Measures Designed to Reduce Impacts, details why some oil and gas stipulations are carried in the tar sand EIS and why they are appropriate. It also explains how specific stipulations for tar sand surface mining will be developed. The time constraint stipulations (items 7 through 10, 6 through 9 in the final EIS, Section 4.A) are resource protection stipulations developed by BLM in conjunction with the Utah Division of Wildlife Resources to protect wildlife and reduce impacts. The time restrictions are part of the Price River Management Framework Plan (BLM 1983g).

22-7 We believe that mitigation measure 7 (6 in the final EIS) in Section 4.A is a mitigation measure and not an impact.

The wildlife studies listed under mitigation measure 8 were requested by BLM's Moab District, Price River Resource Area to be included in this EIS. The information received from these studies will assist in future mitigation and stipulations for wildlife protection.

Comment Letter 23

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Centers for Disease Control
Atlanta GA 30333

January 3, 1984

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

We have reviewed the Draft Environmental Impact Statement (EIS) for Sunnyside Combined Hydrocarbon Lease Conversion, Utah. We are responding on behalf of the Public Health Service.

Because this proposed action is broad in scope, we understand that additional site-specific environmental analyses will be required should a lease be converted. We would like to receive a review copy of each of these environmental analyses as they become available.

We do, however, have several concerns with the present Draft EIS, since many adverse environmental impacts will result from this proposed development. Many of these impacts will not be mitigated or will be only partially mitigated. These adverse impacts include:

- Housing - The communities affected may not be able to provide adequate and affordable housing.
- Education - An increase of teachers and classrooms of 172 percent will be required by 2005.
- Medical - All medical services and facilities would be severely affected because no additional capacity would be available to support the increased demand from the assumed tar sand development and interrelated projects.
- Sewer - Some of the communities involved are already over capacity. With the development, Huntingdon's treatment capacity will be overloaded by 1985 and East Carbon and Sunnyside would exceed their capacity by 2000.
- Water - Available information on community water systems indicates little or no excess capacity in terms of connections. Water demand in Carbon County alone would be increased by 178 percent by 2005.
- Air Quality - Potential violations of the National Ambient Air Quality Standards are predicted for total suspended particulates and nitrogen dioxide.

- Water Resources - Depletions will occur in either the Price or Green Rivers. Additionally, water quality deterioration will occur.

23-1 There are other effects which were not addressed. It was stated that floodplains will be altered. Does this proposed project conform with Executive Order 11988? It was noted that both Encor and Sabine have not

23-2 committed to implementing any special mitigation measures at this time. What requirements will be placed on these two companies to assure mitigation measures before the project is implemented?

23-3 It was also noted that several sedimentation ponds will be developed. However, no discussion was provided concerning mosquito or other vector populations. The Final EIS should discuss existing mosquito populations in these areas, the effect of building sedimentation ponds on these populations, and the control measures that may be employed for mosquito control.

Thank you for the opportunity to review this Draft EIS. Please send us a copy of the Final EIS when it becomes available. If you have any questions about our comments, please contact Mr. Lee Tate of our staff at FTS 236-4161.

Sincerely yours,

Frank S. Lisella

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

RESPONSES TO COMMENT LETTER 23

23-1 Mining would take place in upper parts of the drainages where the type of floodplains referred to in the executive order do not exist. The text has been changed accordingly.

23-2 These two companies will have to meet appropriate requirements of the measures listed in Sections 4.A, and 4.B, and Appendices A-3 and A-4 and any other measures developed in the future as a result of the EIS process.

23-3 Appendix A-7 has been changed to reflect this concern.

Comment Letter 24

United States Department of the Interior

BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

IN REPLY REFER TO: UC-150
120.1

JAN 4 1984

Memorandum

To: District Manager, Bureau of Land Management, P. O. Box 970, Moab, Utah 84532

From: Acting Regional Director
Bureau of Reclamation

Subject: Review of Draft Environmental Impact Statement - Sunnyside Combined Hydrocarbon Lease Conversion (DES 83/70)

We have reviewed the above draft environmental impact statement and have the following comments to offer:

24-1 The status of the water sourcea for each of the propoaals is not clear in the statement. While the gross amounts of water required are arrayed, we question both the physical and institutional availability of some of the sources.

Our experience has been that virtually all water aources are fully or over-appropriated, and that water rights are nonexistent. Further, if the plan ia to have water released from Flaming Gorge into the Green River, a water service contract with the Federal Government would be required.

We think it would be helpful to have this information arrayed in the final environmental impact statement.

Action
Info
Discuss

RESPONSE TO COMMENT LETTER 24

24-1 The future availability of water depends on physical and institutional availability and how water sources are appropriated. The Moon Lake Power Plant Project Units 1 and 2 Final EIS (BLM and REA 1981), pages 174-177, gives a detailed presentation of this water situation. The Unresolved Issues section of the Summary of the Sunnyside Final EIS has been revised to include institutional concepts.

Comment Letter 25

slickrock outdoor society
price, utah

January 4, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

We are providing these comments in response to the Sunnyside Combined Hydrocarbon Lease Conversion, Draft EIS.

This project, as proposed and/or described in the various alternatives, excluding the No Action alternative, will have a tremendous impact on the entire region. The draft EIS spells out these impacts in some cases, but significantly downplays the enormous impacts the project will have on the wilderness, wildlife and water resources of the area, particularly the projects off-site impacts. In most instances, the above values are inadequately addressed.

25-1 The EIS recognizes the destruction of the Range Creek fishery, but ignores the value of Range Creek as a fresh water supply for recreationists in the area. It does not adequately address the negative impacts deteriorating water quality will have on users in the Rock Creek drainage especially near the head waters. Any deterioration in water quality at the mouth of Rock Creek could significantly affect river runners since Rock Creek is their primary water resupply point when floating the Green River.

25-2 The EIS is disturbingly vague when discussing the proposed water source from the Green River, and the effects this will have on the river's

page 2

25-2 (cont.) potential for Wild & Scenic River designation. The EIS merely states that, "Water diversions, dam structures, pump houses, access roads.... could likely jeopardize any potential for Wild & Scenic River designation on the Green River." It does not explain where and what kind of impacts will take place. If this is known it should be clearly stated in the EIS. If it has not been determined, then a detailed plan of operation does not exist and the Conversion should not be granted. Certainly, none of these impacts can occur in any of the surrounding WSA's without clearly violating the BLM's Interim Management Policy.

25-3 Wildlife populations could be seriously affected particularly solitude-seeking species like Bighorn sheep, Black bear and Mountain lion. The EIS admits that secondary impacts (traffic, noise, harassment, poaching) "could cause the [Bighorn] sheep to completely abandon current ranges west of the Green River and north of Interstate 70", but ignores secondary impacts to Black bear and Mountain lion. These species, too, may be forced to abandon much of their range west of the Green River. While the EIS, commendably, goes to great lengths in discussing the impacts to Mule deer, those species discussed above, which lend to the area it's unique wilderness character, are hardly considered.

The potential loss of 38% of the elk summer range, a major portion of the black bear and mountain lion populations, and the entire existing population of Bighorn sheep are reason enough to question the feasibility of this proposal.

25-4 Nowhere does the EIS downplay the impacts of the project as severely as in discussing the impacts to the region's wilderness values. The most glareing example is the elimination of the Green River's consideration for Wild & Scenic River status. Desolation Canyon is an internationally known white-water, wilderness, river run. Yet, the EIS fails to consider what impact the destruction of these values will have on the river running resource. In addition, the EIS claims that the project will result in "increased revenues to commercial river runners" and that "increased demand for public permits to float the Green River would be predicted." These two statements are contradictory since an increase in public permits will reduce the number of permits available for commercial outfitters, thereby decreasing, not increasing their revenues. It is also presumptious

page 3

to assume that an influx of workers into Carbon and Emery counties is going to bolster the market for commercial river running outfits. The loss of many of Desolation Canyon's wilderness attributes is likely
25-5 to damage the river running industry, which presently touts the area as the Green River Wilderness.

Adverse impacts to water quality in Range Creek will permanently impair the wilderness quality of both Desolation Canyon and Turtle Canyon WSA's. Significant adverse impacts to all three WSA's will occur due to deterioration of air and water quality, noise pollution, loss of wilderness-dependent wildlife species, diminished hunting opportunities, cultural
25-6 resource damage, and preclusion of Wild & Scenic River status for the Green River. To state, as does the EIS summary of wilderness impacts, that the potential damage to WSA's is limited to air and water quality deterioration and to "the quality of trout fishing in Range Creek", is hardly adequate.

Due to the tremendous adverse impacts of this proposal, the highly speculative nature of the tar sands industry, and the lack of an adequate assessment of the negative impacts to wilderness, wildlife and water resources, we strongly urge the BLM to adopt the No Action alternative. This alternative will protect the unique and highly valued resources in the area. It would allow the development of the interrelated Chevron tar sand project and 16 interrelated coal mines which would certainly provide adequate opportunities for economic growth in the area. The Chevron project, if feasible, will provide important information regarding
25-7 tar sands development that should be obtained before allowing the massive Conversion proposals discussed in the EIS. The No Action alternative will allow the oil and gas lease holders to develop those leased that remain valid.

A plan more destructive to the high quality natural values of the area is hard to imagine. The true impacts of converting these leases must be reevaluated. We ask the BLM to reconsider it's support for the Unitized Development alternative, and we urge BLM to adopt the No Action alternative; an action necessary to protect this spectacular region.

Sincerely,

George Nickas

George Nickas
for the Slickrock Outdoor Society

RESPONSES TO COMMENT LETTER 25

25-1 Tar sand development would not significantly degrade water quality or recreation resources for river runners because no major development is proposed in the Rock Creek drainage.

25-2 See response to comment H-1-2.

25-3 The discussion of big game, in Section 3.A.4, Wildlife, covers secondary impacts, such as displacement of mountain lion and black bear.

25-4, 25-5 The EIS analyzes significant impacts to three wilderness study areas (WSAs) affected by tar sand development: Turtle Canyon, Desolation Canyon, and Jack Canyon WSAs. (See Section 3.A.12, Wilderness Resources, for impact significance criteria.) The EIS also analyzes secondary impacts to wilderness-related values from air and water quality deterioration, water resource related impacts, and population growth.

Using information at the time of analysis, Section 3.A.5, Recreation Resources, analyzes the potential effects of tar sand developments on the quality of river running experiences and on wild and scenic river designation.

One cannot easily predict the total effects on the river running industry of pump houses and access roads at one point on the Green River. Such man-made developments on the Green River wilderness corridor could diminish the quality of river running at one point on the river. Whether they would result in any economic loss by the river running industry is unknown and unpredictable. Because it is presumptuous to predict an increase in public demand to float the Green River (based on energy development near Sunnyside, Utah), it is also presumptuous to assume that any form of man-made development on the Green River would cause a major economic loss for the river running industry. Therefore, the paragraph in question has been deleted from the text.

25-6 The purpose of the summary of impacts is to highlight for the reader those key and significant impacts and not to present at length every possible impact. Section 3.A.12, Wilderness Resources, analyzes in detail impacts to the wilderness resource and to the quality of wilderness experiences.

25-7 Thank you for your comment. It will be considered in the decision making process.

Comment Letter 26

United States Department of Agriculture

Soil Conservation Service

P. O. Box 11350
Salt Lake City, UT 84147

January 5, 1984

Gene Nodine
District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

I appreciate the opportunity to review and comment on the draft environmental impact statement (DEIS) for Sunnyside Special Tar Sand Area.

The DEIS has adequately addressed our major concerns; however, we do have some questions as follows:

	Question	Page	Paragraph
26-1	Why would it be necessary to compact soils on irrigated land reclamation?	A-7-4	7
26-2	Would reconstructed soils have a higher water holding capacity?	P-3-29	4
26-3	This statement would be true where the soils were shallow prior to disturbance, but would it be true on the deeper soils?	P-3-29	4

Please contact me, if you have any questions.

Sincerely,

Harold L. Brown, acting

FRANCIS T. HOLT
State Conservationist

cc:

Pete Myers, Chief, SCS, Washington, D.C.

The Soil Conservation Service is an agency of the Department of Agriculture

RESPONSES TO COMMENT LETTER 26

26-1 Soil materials (backfill) within the pipeline trench would have to be compacted to reduce subsidence and provide for a smooth surface in irrigated cropland areas.

The statement is revised to read--the soils "(backfill) within the trench" would be compacted.

26-2, 26-3 Generally, the reconstructed soils would have a higher available water-holding capacity than the original soils because they would be deeper. About 78 percent of the soils within the area are shallow and moderately deep over bedrock (Section 3.A.3). Also see "Soil Reconstruction Potential" in Appendix A-7.

Comment Letter 27

Utah Wilderness Association
325 JUDGE BUILDING · SALT LAKE CITY, UTAH 84111 · (801) 359-1337

January 5, 1984

Gene Nodine
District Manager, BLM
125 West 200 South
P.O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

We would like to preface our comments on the Sunnyside Tar Sands EIS by saying that we do not think the tar sands resource needs to be developed. Tar sands, like other hydrocarbon resources, are of limited supply. No matter how good our production and refinement techniques, we will eventually use up the resource and degrade the environment at the same time. Instead our efforts should be toward conserving the hydrocarbon resource we do still have and developing renewable sources of energy for the future. This is especially true for tar sands whose technology and economics are as unknown and uncertain as for many renewable energy technologies.

These comments on the Sunnyside EIS generally fall into two catergories: those that deal with the adequacy of the tar sands environmental analysis process and specific comments on impacts which are not addressed or inadequately discussed in the EIS.

27-1 The leasing conversion regulations require the lease holders to submit an "adequate" plan of operations to the BLM before a lease is converted. The plan of operations should assure reasonable protection of the environment and diligent development of the tar sands resource. However, judging by the information on the plans of operation contained in the EIS, neither of these objectives has been met. AMOCO's plans for a pilot plant are sketchy at best. While the Chevron-GNC plan may contain enough information to assess the environmental impacts of the pilot processing plant, little is known about the commerical phase. ENERCOR's plans are vague and they have "not committed to implementing any special mitigation measures" (p. 1-34). While the conversion regulations do allow for changes in the plans of operations, the plans are presently inadequate to accurately assess the environmental impacts which might be caused by approving the lease conversions and subsequent development of the tar sands. On these grounds it would make sense not to approve the lease conversions until the proposed actions have been more laid out and the actual impacts more clearly analyzed. Postponed conversion may, however, be illegal-the November 15, 1983 deadline for the submittal of an adequate plan of operations has already expired.

We do, however, realize that the inability of these 5 companies to develop an adequate plan of operations is largely due to the lack of technological knowledge. It would be difficult for the BLM to deny conversion for exploration activities which must take place prior to development. Therefore, if leases are converted a further environmental impact statement must be written when a detailed plan of operations is submitted. On page S-1 the EIS does state that further environmental analyses will be done if the leases are converted.

27-2 Discussions with BLM officials at the public comment meeting on the Regional Tar Sands EIS in Salt Lake City suggested that the state after this EIS would be an Environmental Assessment, not an EIS. We, however, do not think that a tiered EIS leads to an EA, but rather it should lead to an additional EIS.

The lease conversion regulations state that new leases be issued with all the old stipulations plus "any additional stipulations, such as those required to ensure compliance with the plan of operations." (3140.4-2(a)) This regulation says that additional stipulations can be added to the lease, dependent on the plan of operations. However, if the plan of operations is not detailed enough to describe mitigating measures a catch-22 situation is created: the plan of operations is inadequate to attach stipulations, but without the lease not enough information can be gathered to submit a detailed plan. Once the lease is converted and a detailed plan developed it is too late to attach stipulations. If these leases are converted an environmental impact statement will be necessary to insure that adequate mitigation measures are required because all necessary stipulations cannot be added to the lease at this time.

Section 7 of the Endangered Species Act requires that "The lessee shall develop a plan of operations which will solely protect listed or proposed threatened or endangered species...(A-3-5). The Sunnyside EIS says that significant impacts to the endangered species in the Sunnyside Tar Sands Area could occur if the tar sands were developed. Yet the EIS has little specific information because:

> Current project descriptions do not contain sufficient information to make a full determination as to whether or not the eventual developments would jepordize the continued existence of any threatened or endangered species found in the region (S-5).

27-3 Prior to development of the tar sands, the Endangered Species Act also requires a complete biological assessment of the area, including a detailed survey of these species and their habitat (appendix 8). It is essential that this information be provided to the public in a site specific environmental impact statement. An Environmental Assessment would be an inadequate way to present important data and mitigating measures concerning the protection of our endangered species.

The need for a further EIS to discuss the impacts to proposed threatened and endangered species is even more obvious. There was absolutely no discussion in any way, shape or form of the impacts to proposed threatened and endangered species even though these impacts need to be analyzed. The four animal species proposed for threatened and endangered status are not even listed in the text, only in the appendix. We would like to see the impacts to proposed threatened and endangered species analyzed in a site specific EIS.

27-4 If commercial scale operations will require a further environmental analysis, shouldn't this EIS specifically address the environmental impacts that may be caused by the pilot plant stage? As the EIS says, these impacts would be encompassed by the impacts of commerical development. However, these are necessarily general conversion of the leases based on this EIS would essentially approve exploration and some specific pilot-plant operations, therefore these impacts should be analyzed.

We find many of the potential impacts due to the development of tar sands
to be completely unacceptable. Tar sands development in the Sunnyside area
(could likely jeopardize any potential for Wild and Scenic River designation on
27-5 the Green River) (3-42). The prospect of water development facilities on this
part of the Green cannot be tolerated on a river with such a high quality
wilderness river running capacity. The wilderness of Desolation Canyon would
be lost forever. The Desolation Canyon WSA could also be harmed by tar sands
operations.

The statement that tar sands development might help the river running
guides is most certainly mistaken. Most of people who pay to have guides take
them down the Green are not locals and therefore any increase in local population
27-6 would only minimally aid the guides. More importantly, however, the loss of
wilderness characteristics would significantly decrease the desirability of
using the affected part of the river. The new result could be a significant
decrease in revenues to commerical outfitters.

Similarly, the EIS discusses many of the positive economic effects that
27-7 would be caused by the tar sands project. However, the negative results are
not discussed. What about revenues lost by ranchers who graze the area? The
EIS shows increased revenue because of more hunters. But won't the destruction
27-8 of wildlife habitat decrease wildlife and consequently the number of hunters?
Decrease the money they spend and the meat they harvest?

The general plan for development says that at least initially, overburden
removed by strip mining could be placed in adjacent canyons (1-12). The
canyons would probably be the worst possible place to put any overburden because
27-9 it would essentially act as a sediment feeder for any water moving down the
canyon, severly degrading the quality of that water. In addition, if piled to
high, the overburden might act like a dam collecting water for an untimely
release.

How does this EIS tie into Volume II of the Regional Tar Sands EIS which
proposes leasing categories for the tar sands area? Chapter 4 does list the
specific mitigation measures (or stipulation) identified in Volume II of the
Regional EIS for the Sunnyside STSA though it does not identify the specific
tracts of land that would be covered by these stipulations. It would be very
27-10 helpful if the Sunnyside Final EIS analyzed an alternative for proposed develop-
ment with specific leasing category amendments (the BLM preferred alternative
and/or the resource protection alternative). This alternative would provide
some connection between the two EIS's and be a more realistic alternative than
the partial conversion alternative that is already in the EIS. It would also
aide the understanding of the impacts of the proposed leasing categories by
providing a more concrete example.

While it would certainly be helpful to see the results of an analysis which
looked at the mitigation measures as applied to these specific projects, initial
analysis seems to show very little resource protection. Section 4.C.1 indicates
that many of these mitigation measures would in reality only delay the impacts
27-11 for one year. Even if important wildlife habitat isn't disturbed during the
times of year they are used, won't they eventually be destroyed? Even if no
more than 25 percent of the land is disturbed before reclamation and revegetation
27-12 is substantially complete, won't more than 25 percent be disturbed before any
area is again suitable for wildlife? Though 3-5 years may be sufficient for
27-13 some grasses, it will not be sufficient for many of the native shrubs and grasses

27-13
(cont.) on which wildlife is dependent. Though a no surface occupany stipulation
might protect the surface waters, shouldn't a no leasing stipulation be
27-14 attached to areas of critical watershed. In-situ mining could have a drastic
effect on ground water and the springs they feed. More stringent mitigation
measures must be developed if they are truly to protect important resources.

Sincerely,

Brian Kamm by GM

Brain Kamm
Natural Resource Intern

RESPONSES TO COMMENT LETTER 27

27-1 See reponse to comment 10-1.

27-2 In accordance with the National Environmental Policy Act and the 1978 Council on Environmental Quality Guidelines, the level of analysis (environmental assessment or EIS) will be appropriate to the anticipated magnitude of the impacts in the plan of operations from those described in the Sunnyside Combined Hydrocarbon Lease Conversion EIS. If the plans of operations were scaled down to avoid major impacts or if they were to be carried out precisely as described in the Sunnyside EIS, the EA level of analysis might be appropriate.

27-3 We agree that an environmental assessment would be an inadequate way to present data and measures for threatened and endangered species. Therefore, the official biological opinion from the Fish and Wildlife Service is included in Appendix A-2 of this final EIS as originally planned. Appendix A-8 consists of Endangered Species Act compliance documents, including the official Fish and Wildlife Service Section 7 list of species and an addition to this list.

27-4 Changes to the commercial operation, pilot plant phase, or the proposals described and analyzed in this EIS that are outside of the analysis and scope of this EIS would require environmental analysis before any required federal approval could be given. As you state, this EIS considers that the pilot plant phase would be temporary and its impacts would be encompassed by the impacts of commercial development, which this EIS analyzes. Therefore, the proposed pilot plant phase impacts have been analyzed by this EIS.

27-5 Thank you for your comment. It will be considered in the decision making process. Also see response to comments 25-4 and 25-5.

27-6 See response to comment 25-5. The paragraph has been removed from the text.

27-7 The impacts to ranchers are expressed in animal unit months (AUMs) of forage lost, which are equated to a reduction of livestock numbers. As stated in the final EIS, however, no reductions in grazing preferences are expected and no economic impact would result because BLM does not plan to reduce livestock numbers on the affected allotments.

27-8 The number of hunters does not always follow the trend of game herds. Unless hunter success drops significantly in an area, the number of hunters changes slowly. In most cases, these hunters merely move to nearby areas to hunt, and license income remains virtually the same on a statewide basis. Monies spent by hunters in the local area could decline. Section 3.A.4, Wildlife, has been changed to make this statement.

27-9 To reduce the impacts of surface mining, on-site investigations would be made to select specific sites for overburden placement for mining and reclamation.

RESPONSES TO COMMENT LETTER 27 (Continued)

27-9 Cont. Overburden would be placed so as not to create a dam effect and would be protected by runoff and erosion control measures. Even though runoff control and surface protection measures would be applied, the EIS acknowledges that sediment would increase. (See Section 3.A.1, Water Resources.)

27-10 As noted in your comment, the Sunnyside EIS uses the specific mitigation measures from the Regional EIS. Therefore, the analysis presented in the Sunnyside EIS, Section 4.C, Unavoidable Adverse Impacts, is the same as if the preferred alternative of Volume II of the Regional EIS (BLM 1984) had been developed and discussed. In this way, the Sunnyside EIS provides the connection or tiering between the two EISs.

27-11 Most of the mitigation measures noted in Section 4.C.1 would only delay impacts for 1 year. The measures in this section are the same as those noted in the Utah Combined Hydrocarbon Leasing Regional Draft EIS. These two documents are tiered to each other. Important wildlife habitats destroyed in year 1 would have the same impact on wildlife as if they were destroyed in year 2; the impact is only delayed for 1 year. Applying the mitigation, however, would prevent unneeded impacts on wildlife if exploration and pilot operations show that full development would not be feasible.

27-12 From 20 to 30 years would be needed to reach the maximum area of land disturbance (18 percent of the total area). During this time, areas would be reclaimed and revegetated in a sequence with the rate of disturbance. Understory vegetation (grasses and forbs) are expected to become established within 3 to 5 years. Other vegetation types, such as shrubs and trees, would require longer periods of time to become adequately established to provide wildlife values. Suitability of revegetated areas for some types of wildlife (mule deer) would exceed the 18 percent land disturbance at any one time (see Section 3.A.4, Wildlife, Big Game).

27-13 The 3- to 5-year revegetation period relates to the establishing of understory vegetation (grasses and forbs). Other vegetation types, including shrubs and trees, would require more time to become adequately established to provide wildlife values. See the discussion for each vegetation type for the estimated time required (Soils and Vegetation, Section 3.A.3).

27-14 See Section 4.A, Site-Specific Mitigation, for measures to protect Public Water Reserves and the Sunnyside Water Supply Reserves. The partial conversion alternative considers the option of not converting portions of leases on critical watersheds.

Comment Letter 28

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:

L7619 (RMR-PC)

JAN 5 1984

Memorandum

To: District Manager, Moab District, Bureau of Land Management, Moab, Utah

From: Associate Regional Director, Planning and Resource Preservation, Rocky Mountain Region

Subject: Review of Draft Environmental Impact Statement (EIS), Sunnyside Combined Hydrocarbon Lease Conversion, Utah (DES-83/70)

The National Park Service has reviewed the subject document and has the following comments.

General Comments:

Generally, we find the draft EIS to be an excellent presentation of the proposals and their impacts. It also appears to us that the Bureau of Land Management has endorsed the best alternative - partial conversion under unitized operations.

28-1 However, Amoco and Mono Power have proposed to utilize only one-third to one-half of the land they want to convert to combined hydrocarbon leases. The partial conversion alternative of the EIS, as it relates to these two companies, is based on the entire conversion area and would still result in conversion of a great deal more land than these companies have proposed to use. We suggest that the partial conversion alternative should discuss conversion of only the land involved in proposed operations with the special stipulations applied.

28-2 It would be helpful if pollutant emission rates were given. This would allow easier comparisons with other environmental impact statements for combined hydrocarbon development proposals in the same region.

Some of the following comments may be addressed in the DEIS technical support document, a copy of which we requested but were unable to obtain for analysis.

Specific Comments:

Pages 1-34 and 1-40, Additional Environmental Protection Measures

28-3 These pages state that two of the companies involved, Enercor and Sabine, have not committed themselves to implementation of special mitigation measures. We are concerned that this lack of commitment poses a potential for substantial adverse impacts on cultural resources, even though Appendix 3 indicates that a Memorandum of Agreement is being developed with the Advisory

28-3 (cont.) Council on Historic Preservation and the Utah State Historic Preservation Officer. We recommend that this situation be resolved prior to publication of the final environmental impact statement, and that the FEIS clearly show that all five companies have agreed to operate under the terms of an approved Memorandum of Agreement.

Page 1-42, Constraining Criteria

28-4 This page states that constraining criteria for threatened and endangered species and their critical habitats were not based on field surveys. We recommend that the document should discuss how these criteria would be implemented in practice.

Table 2-1 - Summary Comparison

28-5 PSD Increments - The total suspended particulate 24-hour increment is incorrectly listed as a 3-hour increment.

28-6 NAAQS - Change the superscript^2 to a subscript$_2$ for the last pollutant - NO_2.

28-7 Visual Resources - To avoid confusion with air quality classifications, emphasize that the classifications under this category are Visual Resource Management (VRM) classifications.

Tables 2-1 and 3-34 - Pollutant Concentrations

28-8 It is not clear why the partial conversion alternative would have higher pollutant concentrations than the proposed actions. The proposed actions have a lower annual average daily production rate (1554 bpd/year) than the partial conversion alternative (1633 bpd/year). However, the proposed actions have a higher annual average oil production (approximately 35 million barrels) than the partial conversion alternative (approximately 22 million barrels). Therefore, the total production estimates are not consistent with the estimated daily production rates (unless the partial conversion alternative includes fewer days of operation).

Page 3-4, Range Creek Watershed

The draft EIS indicates that 4,311 acres out of a total of 11,769 acres in the Range Creek Watershed would be disturbed by the proposed development and interrelated projects, including a disposal area downstream that is located outside the STSA boundary. The document recognizes that water quality would be degraded due to increased erosion, and page 3-5 even raises the possibility that the flow would cease altogether if Range Creek is used as a water source for the proposed project.

28-9 Range Creek, from the Green River to its source, has been included on the final list of the Nationwide Rivers Inventory. Rivers on this list have been selected after consideration of the degree to which they are free-flowing, the degree to which the river and corridor are undeveloped, and the outstanding natural and cultural characteristics present on the river and in its immediate environment. The Nationwide Rivers Inventory was completed for the purpose of identifying potential wild, scenic, and recreational rivers within the United States.

It is clear from the information presented that adverse effects on Range Creek would result from implementation of any of the alternatives except the No Action Alternative. We are especially concerned that the scenic and recreational values for which Range Creek was listed in the Nationwide Rivers inventory will be seriously degraded during both short-range and long-range
28-10 periods of time if the Sunnyside Special Tar Sands Area (STSA) is developed as proposed. We recommend that consideration be given to avoiding resource development in the area of the Range Creek corridor in order to help preserve the aforementioned values and so as not to preclude the inclusion of Range Creek in the National Wild and Scenic River System.

Pages 3-41 and 3-42, Fishing and Floatboating

We are also concerned about development along the Green River which would, according to page 3-42, "jeopardize any potential for Wild and Scenic River designation." Besides the obvious threat to the river's scenic and recreational values, these developments threaten the integrity of Desolation Canyon as a potential National Historic Landmark. Such landmarks are designated for their contributions to the historic development of the United States. In view of the potential adverse impacts resulting from these
28-11 proposed developments, we must question the statement that commercial river runners will see increased revenues due to the population increases which would result from the proposed project. The appeal of the Green River to river runners and recreationists would likely be greatly reduced by the intrusion of a significant number of man-made structures. Under such conditions, it is difficult to see how local commercial river runners would realize greater revenues and/or profits. It appears to us that quite the opposite might result.

The EIS should also note that the study report and final environmental impact statement on the Green/Yampa Wild and Scenic Rivers was transmitted by the Secretary to the Congress on November 14, 1983. The EIS should point out that the study resulted in a conclusion that all 138 miles of the studied river areas are eligible for designation. However, no designation is being
28-12 recommended at this time until activities concerning quantification and litigation of Federal reserved water rights for Dinosaur National Monument; completion of the wilderness study of the Cross Mountain area; development and evaluation of a water diversion proposal to meet Stage III of Cheyenne, Wyoming's water project; and evaluation of needs for water to facilitate energy resource development are resolved.

Tables 3-22, 3-35, 3-46 - Level 1 and 2 Visibility Analyses

28-13 The Plume/observer/target geometry should be presented in detail as well as all assumptions on meteorological and light scattering conditions.

Page 3-50 - Sulfur Dioxide

28-14 It appears that a map of sulfur dioxide concentration isopleths was inadvertently omitted from the air quality discussion.

Page 3-87 - Air Quality (Partial Conversion Alternative)

We recommend that the maps of pollutant concentration isopleths (3-8, 3-9,
28-15 and 3-10) follow the narrative discussion, not precede it. Also, change "Nitrogen oxide (NO_x)" to "Nitrogen dioxide (NO_2)" in the second paragraph, right column.

We appreciate the opportunity to provide these comments.

Richard A. Strait

RESPONSES TO COMMENT LETTER 28

28-1 Each company has applied to convert every acre of every lease, even though their current plans of operations would use only a portion of this acreage. In analyzing impacts, BLM used a worst-case analysis, which assumed that all acreage would be disturbed. This approach was used because the extent of the tar sand resource is not known and will not be known until the companies have completed their exploration.

The plans of operations were based on the best knowledge of the resource at the time a plan was submitted.

This same level of analysis was used for the partial conversion alternative.

The decision maker for the lease conversions may select from any of the alternatives described in the EIS or from levels of conversion intermediate to those described (from full conversion to no action). Therefore, the alternative suggested in the comment is an option that can be selected.

28-2 Previous combined hydrocarbon EISs have presented emission rates in technical reports, and this convention is expected to prevail in future combined hydrocarbon EISs. The emission inventory and methodology is presented in detail in the Air Quality Technical Report (Aerocomp Inc. 1983), which can be obtained from Gene Nodine, District Manager, BLM Moab District Office, 125 West 200 South, P.O. Box 970, Moab, Utah 84532.

28-3 Special mitigating measures will be stipulated in converted leases and will be required of all five companies in accordance with the memorandum of agreement and 36 CFR 800, regardless of whether Enercor and Sabine have committed themselves to implementing special mitigation measures. (See Appendix A-3, Cultural Resources.)

28-4 In preparing the biological assessment based on the wildlife impact analysis, BLM determined that some of the species on the U.S. Department of the Interior, Fish and Wildlife Service (FWS) Section 7 list (Appendix A-8) are in a "may affect" category. BLM sent this assessment to FWS, who prepared a biological opinion (Appendix A-8) agreeing with BLM's assessment. This biological opinion suggested mitigation or stipulations to alleviate potential impacts to threatened and endangered species..

28-5, 28-6 Table 2-1 has been corrected.

28-7 The text has been revised in Section 3.A.6, Visual Resources.

RESPONSES TO COMMENT LETTER 28 (Continued)

28-8 The apparent inconsistency between production rates and NO_x emission rates for the proposed actions and partial conversion alternative results from differences in source configuration. Under the proposed actions, Mono Power would contribute 24 percent to the total production, whereas under partial conversion Mono Power would contribute 83 percent. Mono Power proposes using solvent extraction, which emits a greater proportion of NO_x than hot water extraction .

The SO_2 and NO_2 air quality impacts would be greater from the partial conversion alternative than from the proposed actions because tar sand production under partial conversion would be mainly concentrated at the Mono Power facility, whereas the proposed actions production would be spread over five sites. Moreover, the NO_x emission rate would be greater for the partial conversion alternative for the reasons discussed above.

28-9 Section 3.A.5, Recreation Resources, Fishing and Floatboating, has been changed to discuss the Nationwide Rivers Inventory.

28-10 As stated in these comments, information on impacts to the scenic recreation values of Range Creek is presented in the EIS and will be considered in the decision making process.

28-11 The possibility of developments along the Green River would not necessarily jeopardize any potential for wild and scenic river designation for the entire 91-mile segment of the river. Point source impacts, however, could adversely affect portions of the Green River for future designation. Mitigation, such as vegetation or physiographic screening, may also be possible. In any event, future environmental analysis will be needed when the plans of operations become better defined.

We have deleted from the final EIS the statement concerning increased revenues for commercial river runners due to expected regional population increases.

28-12 Discussion of this study has been added to the Recreation Resources Section 3.A.5, Fishing and Floatboating.

28-13 The plume/observer/target geometry and assumptions provide technical support for analysis and are presented in detail in Table 3.2-6 of the Air Quality Technical Report (Aerocomp Inc. 1983).

28-14 A map of SO_2 concentration isopleths was not included because violations of the NAAQS were not predicted, nor was the PSD Class Annual SO_2 increment expected to be exceeded. Excluding such maps conformed to the convention in the air quality sections of the EIS, which included only isopleth maps for violations of NAAQS and exceedance of PSD annual increments.

28-15 These maps have been moved to follow the text in this EIS. Nitrogen oxide (NO_x) has been changed to nitrogen dioxide (NO_2).

Comment Letter 29

January 7, 1984

Mr. Gene Nodine
District Manager
Bureau of Land Management
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine,

I am writing to comment on the Sunnyside Hydrocarbon Lease Conversion plan proposed for your BLM district.

I am opposed to the proposed conversion of the oil & gas leases within the Sunnyside Special Tar Sand Area.

I feel that tar sands are still in an experimental phase and that that size area should not be destroyed for something that has not been shown to be cost effective.

29-1 Questions relating to how water would be pumped out of the Green River and what environmental & recreational impacts that would have have not been fully adressed in the E.I.S.

Sincerely,

Heather Campbell
PO Box 817
Vernal, Utah 84078

RESPONSE TO COMMENT LETTER 29

29-1 See response to comment H-1-2. The location of the pumping station on the Green River was not specified in the plan of operations, nor was the location of the water pipeline. The expected impacts of these conceptual ancillary facilities are analyzed in the EIS but only conceptually. Once the locations of these facilities are determined, another impact assessment will be prepared. More discussion on the economic and recreation aspects of river running have been added to Sections 3.A.2, Socioeconomics, and 3.A.5, Recreation Resources.

Comment Letter 30

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

January 6, 1984

MOAB DISTRICT OFFICE

Mr. Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

The National Oceanic and Atmospheric Administration offers the following comments on the "Sunnyside Combined Hydrocarbon Lease Conversion Draft Environmental Impact Statement." Our comments which were prepared by the Environmental Research Laboratories Air Quality Division in Boulder, Colorado, address only the air quality sections of the DEIS. We appreciate the opportunity to provide comments and would like to receive 3 copies of the FEIS.

General Comments

30-1 Review of the air quality section brings out several general criticisms. This section appears to rely heavily on model results for its conclusions concerning ambient air quality standards. The only information on this model is its name (Version II - Reactive Plume Model). A more detailed discussion of the model itself is needed to convince the serious reader of the validity of its results.

30-2 The second criticism concerns the validity of any model results in the complex terrain where this development is proposed. The maps provided with this document indicate that the major development would occur on high ground surrounded by large and very rugged drainages. An elevation difference of 1000 ft. between the development site and adjacent low ground is common. Temperature inversions established close to the ground will certainly trap pollutants emitted by the proposed development. Drainage flow into the adjacent low lying areas will concentrate and further trap the pollutants. It could take days to flush the pollutants from these drainages. Acid precursors (NO_x and SO_2) would abound in these drainages and wet or dry deposition could create a serious acidification problem in the affected areas. At this point, these comments are only speculation. However, they present a reasonable scenario and one which is not addressed in this document. Observational work should be done to confirm or refute this hypothesis.

30-3 Table 3-16. The O_3 standard is comparable to the maximum O_3 concentrations known to occur naturally in remote, mid-latitude areas, primarily as a consequence of tropospheric-stratospheric exchange and downward transport of stratospheric air parcels.

30-4 Pg. 3-46. The statement is made that visibility is the only air quality related value considered significant in the planned tar sands developments; later discussion (e.g. pg. 3-50) indicates that in certain areas the NO_x and SO_2 NAAQS and/or PSD increments could be violated. It might be well to expand such discussions to include estimates of probability of such impact under realistic meteorological conditions, and including atmospheric chemical processes in this semi-arid region.

30-5 Pg. 3-47. The statement is made that "existing air quality is very good," there is no definition of seasonal and meteorological variability, except in terms of seasonal averages. Also, the geometric means of visual range at several locations are stated in terms that seem to imply greater precision than is actually the case, and that gives no indication of confidence levels and variability.

30-6 The statement made in the last sentence of the section titled "Setting," pg. 3-47, implies that the low regional SO_2 and ambient TSP concentrations are the primary factors in the good regional visibility, to the exclusion of other visibility factors related to the synoptic scale metrology. A study conducted at Cedar Mountain (P.S. Allee and R. F. Pueschel, "A Study of Visibility in Carbon and Emery Counties, Utah," NOAA Data Report ERL ARL-1, 1980, 107 pp. attached) demonstrated (1) the greatest reduction in visual range during periods of southerly air flow, (2) an inverse relationship between relative humidity and visual range, (3) implication of accumulation mode aerosols in visual range limitation, rather than the coarse mode (essentially TSP), except during high winds, and (4) a comparatively low sulfur incidence in the ambient atmospheric aerosol.

30-7 Some references to NO_x and SO_2 emissions assume that all were combined to form a single plume. This is a conservative practice in that the estimated maximum concentrations would be greater than for multiple plumes. However, it is not conservative in the sense that the area of impact may be understated.

30-8 Map 3-7 indicates that maximum emission for NO_2 could be exceeded within the proposed development. The authors take the view that this problem will vanish with more refined modeling or additional observations. It is just as likely that the problem will be found to be worse after the analysis of additional data. It seems that the authors intent is to show that the proposed development will meet minimum air quality standards at all costs rather than objectively evaluating available data. Additional observational evidence should be gathered to confirm and solve the problem.

Sincerely,

Joyce Wood

Joyce T. Wood
Chief, Ecology and Conservation Division

Enclosure

RESPONSES TO COMMENT LETTER 30

30-1 RPM-II was used only to model worst-case photochemical smog episodes. Model descriptions and methodologies are presented in Section 3.2 of the Air quality Technical Report (Aerocomp Inc. 1983).

30-2 The data needed to consider such a scenario does not exist. To study such an occurrence, a mesoscale sampling network would have to be established. For this study, the only local meteorological data consisted of 10 months of tower wind observations at a site just north of East Carbon below the Book Cliffs. As stated in Section 4.B.2, Applicants Baseline and Impact Monitoring Programs, site-specific meteorological data will be collected and a tracer study conducted before on-the-ground development.

30-3 This comment has been noted and the information retained for EIS use.

30-4 See response to comment 30-2. After consultation with EPA Region VIII, the National Park Service, the Utah Bureau of Air Quality, and the Ute Indian Tribe, among others, BLM decided that level-1 and level-2 visibility analyses were sufficient for this study. Uncertainties in many critical parameters, such as air emissions, facility location, and meteorology, precluded a level-3 visibility analysis.

Worst-case photochemical smog scenarios were evaluated by RPM-II. Since photochemical reactions in rural areas involve methane, CO, and such trace organics as naturally emitted terpenes, a 17-species, 68-step carbon bond mechanism was adopted (Whitten, Hogo, and Killus 1980).

30-5 Tables 2.1-2, 2.1-3, and 2.1-4 in the Air Quality Technical Report (Aerocomp Inc. 1983) summarize ambient air quality in the study area. The tables contain all known monitoring data pertinent to the region.

The average visual range data provided in the technical report was considered adequate for the study. Additionally, the visual range histogram in Figure 2.1-8 of the technical report gives visibility frequencies at Cedar Mountain. Visibilities less than 62 miles occur 1 percent of the time; visibilities over 124 miles occur 41 percent of the time.

30-6 You are correct. The statement as worded in Section 3.A.7, Air Quality, Setting, has been changed; TSP concentrations are no longer discussed in this section.

30-7 The simplification of combining multiple sources to form a single plume was only assumed for the visibility analysis and the worst-case photochemical smog scenarios. In these instances, only maximum impact (not area of maximum impact) was of interest, and thus the single plume simplification is conservative. No such simplification was assumed in the calculation of SO_2, particulate, and NO_2 ambient air quality impacts.

RESPONSES TO COMMENT LETTER 30 (Continued)

30-8 A conservative approach was adopted throughout the analysis. For instance, VALLEY, an EPA screening algorithm, was used for the near-field air quality assessment.

In general, the potential SO_2 and NO_2 violations of air quality standards and PSD increments would be localized; impacts would occur mainly at nearby elevated terrain. TSP impacts would cover a larger area because they would result from surface mining. The Sunnyside STSA would likely remain a non-attainment area for TSP during most of the mining years. Also see response to comment 30-2.

Comment Letter 31

Anderson "Western Colorado" Camps Ltd.

COLORADO RIVER RANCH FOR BOYS | HILL TOP RANCH FOR GIRLS

WILDERNESS PIONEER CAMP FOR BOYS AND GIRLS

GYPSUM, COLORADO 81637

TELEPHONE (303) 524-7766

January 11, 1984

B.L.M.
Price River Resource Area
P.O. Drawer AB
Price, UT 84501

Dear Sir:

As a Desolation Gray Canyon outfitter, we would like to comment on two pieces of information we have recently recieved for the B.L.M.

31-1 First we are strongly in favor of the All Wilderness alternative for the Desolation Gray area. It is a beautiful and unique area worthy of wilderness designation.

Second we strongly oppose the sunnyside combined Hydrocarbon Lease conversion. It appears as though it would have adverse effects on the Desolation Gray area. The air quality, some of the aquafers and Rock Creek would all be negatively effected.

Thank you for your cooperation and consideration.

Sincerely,

Kevin Golic

Kevin Golic
Wilderness Pioneer Camp
Anderson Camps

KG/me

ACCREDITED CAMP

RESPONSE TO COMMENT LETTER 31

31-1 BLM appreciates your comments. The views expressed in this letter will be considered in the decision making process.

Comment Letter 32

Chevron

Chevron Resources Company
A Division of Chevron Industries, Inc.
595 Market Street, San Francisco, California
Mail Address: P.O. Box 7147, San Francisco, CA 94120-7147

January 25, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Mangement
125 West 200 South
P. O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

Chevron appreciates this opportunity to provide comment on the Sunnyside Combined Hydrocarbon Lease Conversion Draft EIS. We were pleased to meet with the staff on several occasions and explain our project and discuss the tar sands development in the Sunnyside area.

As we have expressed before, we are willing to discuss potential joint ventures or other arrangements with other lease holders in the area.

32-1 During the EIS preparation period, Chevron revised its plan of operations in response to a request for more information from BLM. We understand that this revised plan was not used for the EIS preparation, consequently, the EIS analysis of the Chevron Plan of Operations does not reflect many improvements made in that plan.

We commend BLM for its efforts in drafting the EIS, however we note that there are numerous inaccuracies, misconceptions and errors which may mislead a reader into believing that the environmental effects of lease conversion would be more severe than a more careful analysis of the data and correction of misconceptions would indicate.

32-2 Chevron is particularly opposed to one of the alternatives considered -- the partial conversion alternative. In this alternative, BLM would deny lease conversions on many tracts (including Chevron's) for reasons that appear to be based on subjective evaluations and an over-emphasis on the visual impact of mining which would produce changes in the character of the second line of mountains viewed from distant highways -- the changes would be compatible with the present view and not as significant as presented in the EIS. Indeed, the abstract mentions a view which suggests the mining operations on the Roan Cliffs could be visible from the valley communities, yet the Book Cliffs hide the STSA from the nearest towns, and only from considerable distances are the lease areas seen above the intervening ridges and mountains. Much of the scenery consists of bare rock cliffs, and mined areas may not be obvious. Only in Whitmore Canyon and at the base of the Roan Cliffs would mining be more than barely noticeable. The area is one of considerable scenic value, but can be adequately restored following mining. Precipitation is sufficient to support a considerable vegetative community at present on shallower slopes and a restored community should prosper.

32-3 Evaluation of impacts upon the area's Visual Resources is the most serious error we believe the BLM has made in the EIS. The error consists of classifying as VRM Class V those areas of mining where the natural terrain consists of nearly vertical, bare cliffs closely resembling a highwall in a surface mine. In its own evaluation of a mine site at which no reclamation was conducted, BLM has classified it as Class II. The Bruin Point

area consists of steep to very steep slopes and cliffs leading from Grassy Trail Creek up to the ridge. Chevron's proposed tar sand mine on private ground occupies a portion of this slope. In prior years a mining operation was conducted on this ground and has left a highwall and bare slopes which are compatible with the surrounding ground, but upon inspection it is clearly a previous unreclaimed mining operation. It is indicated on Map 3-5 (Visual Resources) by two crossed pick and shovel symbols representing a mine. It is included in a large Class II area extending from off the map to the southeast northwestward across the map. The BLM proposes to consider mined areas as Class V areas, but did not categorize this old mine as such. Clearly it could not have been overlooked or have escaped notice, as it is very distinctly noted on the map and was visited by the EIS team. Pictures of the area appear in the EIS. It also could not have been considered too small for inclusion, for small areas of lesser disturbance exist at the intersection of Water Canyon and Whitmore Canyon. This area was classified as Class V. Natural restoration has occurred in the approximately 30 years since the mine was abandoned only to a small degree. The obvious conclusion is that the visual impact of past mining is not significant and future mining can be considered of little visual consequence.

32-3 (cont.) To consider that mining operations in this area would reduce the VRM class to Class V is not a correct assumption, based upon BLM's own analysis of the existing mine areas. Revegetation programs using stockpiled top soil will speed restoration of visual quality relatively quickly on those disturbed areas. With benches on highwalls as may likely be developed, level areas for restoration will be available even on the high wall slopes, adding to reclamation of visual qualities.

32-4 BLM also errs in its appraisal of the extent of visual impacts regarding the number of people who could see the mine areas.

The Book Cliffs and West Ridge block the view of the Southwest Slope of the Roan Cliffs (where the claimed visually sensitive projects are located) from the towns of Dragerton, East Carbon City and Sunnyside and from highways 123 and 124. The only area where significant visual impact could occur is within Whitmore Canyon, and for the Chevron lease, only north of Grassy Trail Reservoir (a restricted travel area) is the property visible from the road in the canyon.

32-5 Further, under the Partial Conversion alternative, disallowing mining on the southwest slope of the Roan Cliffs near Bruin Point would make recovery of the remaining tar sands less economical since, as stated in the Combined Leasing DEIS "Bitumen could not be extracted by surface-mining methods in parts of the STSA because rocks dip more steeply than the slope of the land surface and the over-burden is too thick. However, tar sand in locations near outcrops is amenable to surface-mining methods because bitumen impregnations are thick and relatively continuous. Although more than 1,000 feet of overburden and bitumen-impregnated rock could be removed from the upper part of the Roan Cliffs, the stripping ratio would be less than 1 to 1, which is favorable for development with surface-mining methods."

One of the elements in BLM's treatment of the area is protection of wildlife. The Endangered Species Act recognizes certain plants and animals as being in danger of extinction and forbids actions which would significantly jeopardize a species. At the other end of the wildlife management spectrum are game animals. These species are

protected from taking by hunting regulations, seasons, licenses, and limitations on how many and which category of these animals may be killed. One of the main functions of state wildlife resource management personnel is to assure a sizeable population of these game animals so that the recreational experience of hunting is sufficiently rewarding. Populations of game animals are controlled through varying the length of the season, the sex and age of animals which may be taken, and the number of animals which may be killed. Where game populations increase, these parameters can be changed to allow more animals to be harvested. When the populations decrease, the state game management agency can reduce the length of the season, reduce the number of animals allowed per hunter, allow, say, only mature males to be taken, or may even close the season to hunting of a particular species altogther. Project management working in consultation with State Wildlife managers should be able to adopt satisfactory mitigation
32-6 measures and federal restrictions should not be necessary, other than perhaps a requirement to consult with state wildlife officials.

Economics are usually not a relevant factor when it comes to mitigation measures applied or prohibition of an action when an agency requires protection for an endangered species. Compliance with the Endangered Species Act may require that extremely expensive measures must be taken to avoid an unacceptable impact upon an endangered species. A project may even be prohibited. Such is not the case, however, when species other than those which are rare or endangered are under consideration. This is especially true when projects are prohibited because of a relatively slight impact on a large population of animals protected under game management. Restricting activities involving hundreds of thousands of dollars in order to avoid frightening deer from fawning areas during exploratory drilling seems unnecessary. Deer typically graze at
32-7 night and restricting drilling or other surface activites to daylight should offer satisfactory protection of these animals, assuming that protection is even needed.

Another factor not considered sufficiently is the effect that land reclamation can have in improving the quality of wildlife habitat. Chevron uses a seed mixture at its Vernal Phosphate operations approximately 80 miles northeast of its present lease site and
32-8 chose the mix to be especially useful for wildlife grazing and reclamation. Of course, if agencies prefer other mixes we will be agreeable to change our seed mixture proposed for the Sunnyside area.

Air emissions modelling in the DEIS indicates that there will be exceedances of the PSD increment and NAAQS values. This may not in fact actually occur, as there are several obviously incorrect assumptions used in the air study and the selection of arbitrary values and methodology assumptions has likely skewed the results toward higher emission factors than actually would exist.

Examples include:

32-9

1. The Chevron-GNC processing plants do not use a hot water extraction process as is stated.

2. Chevron's tailings will be hauled in pipelines in slurry form (with no emissions), and will be dumped as slurry with water reclaimed from the tailings pond. It is our practice to manage the tailings pond so that a maximum area is covered with water or wet, thus reducing wind emissions.

3. Drilling operations conducted wet, as required by Mine Safety and Health Administration rules, will not release the assumed 1.5 pounds of emissions per hole as stated in the air report. 30 CFR55.5-3 states: "Holes shall be collared and drilled wet or other efficient dust control measures shall be used ...".

4. Blasting figures assume 49.8 pounds of emissions per blast, but do not take into account tar sands natural dust suppression capabilities. Emissions from blasting using an 80% reduction factor (as is used elsewhere) for tar sands would result in a 40% total reduction, (assuming a 1:1 overburden/ore ratio).

32-9 (cont.)

5. The emission factors themselves are values assumed from other studies and may not represent the characteristics of the tar sands deposits.

6. The models used may tend to considerably overestimate concentrations of pollutants, and the actual case may be considerably better than modeled.

Yet another air issue is the fact that EPA is considering revising its particulate matter
32-10 standard which would lessen the impact of the mining operations upon air quality as reflected in compliance standards.

Several of the uncommitted mitigation measures, Appendix A-4, are actions which are either restricted to governmental bodies or should be primarily their responsibility.

Items 4 and 5 in the Socioeconomics category are examples of these. Funding for planning positions certainly could be negotiated with a project proponent, but
32-11 implementation should be by local governments. Such funding could be arranged between local governmental units and project proponents as pre-payment of taxes.

Item 7 in Wildlife is also an item which is always an option of the State Division of
32-12 Wildlife Resources. They have the authority over hunting and fishing licenses, regulations and limits in the area.

Item 3 under the Transportation Networks heading is also a subject of local control and is
32-13 not an option to the project management. Installation of traffic signals is a prerogative of local authorities, not private citizens.

Item 2 in the "Miscellaneous" section is somewhat perplexing. While some signs are amenable to reduction of visual contrast between the sign and the surroundings, highway
32-14 signs should not be subjected to this requirement. One can easily imagine the havoc which would be created by designing a stop sign which offered such little visual contrast as to be unnoticeable. We intend to use standard highway signs.

Some of the uncommitted mitigation measures would result in taking business away from established local businesses. They could be seen as unfair competition and would have a
32-15 negative impact upon local residents. Provision of homes, trailer sites and mobile homes (Item 1) and establishment of a housing office (Item 7) competing with local real estate developers and investors are examples.

32-16 It is Chevron's policy to obey all the regulations in effect. Game violations connected with employment therefore should not occur, and any employee who disregards company

Mr. G. Nodine -5- January 25, 1984

32-16 (cont.) policy is always subject to dicipline. Mitigation measure 5 would not be needed for our project.

32-17 Much of Chevron's lease is comprised of steep slopes, over 50%. In order to properly prepare for development, exploration/development drilling is necessary. While the mitigation measure No. 4 in part 4.4 of the EIS exempts mining, mining cannot start before this drilling is done. This would have the effect of denying Chevron's lease conversion. The mitigation measure should exempt exploratory work which can be done only through drilling on steep slopes.

Finally, we would like to thank Robert Pizel and his staff for working so well with us and for visiting our project site. We again thank BLM for providing this opportunity to comment on the EIS. If further discussion is desired, I can be contacted at (415) 894-9652 or the address shown above.

Sincerely,

Lewis M. Cook

cc: Mr. R. E. Pizel

RESPONSES TO COMMENT LETTER 32

32-1 The commenter did not say which improvements were excluded, but BLM did incorporate Chevron's revised plan (received on March 28, 1983) in the draft EIS.

32-2 The concept used in the visual resource analysis for partial conversion centers on the highly significant adverse impacts on the background view from valley areas. These impacts would mainly consist of landform modification and secondarily, vegetation change. Some of the acreages identified under this criterion are long-distance background views from across the valley, but the skyline and color and textural values of the affected lands would be adversely affected. Applying this methodology, BLM's visual resource specialist mapped visual resource critical areas (Map 3-5) and then transferred this data to Map 1-5 to show a compilation of constrained areas for all affected resources.

In reference to the apparent inconsistency in the effects of revegetation, the objectives of revegetation are different for various resources. Revegetation objectives for soil stabilization and watershed protection differ from those for visual resource impact mitigation. Many more years, possibly decades, would be needed to restore vegetation to the point where no apparent line, color, and textural contrasts would occur between the new and indigenous vegetation. The effects of landform modification through surface mining are long term because of the huge volumes of material moved, the contrast of the new landform with unmined lands, and perhaps the lack of diversity.

32-3 The objective of VRM Class V designation is to show areas where the naturalistic character has been so badly disturbed that rehabilitiation is needed to bring it back into character with the surrounding landscape. The designation should be considered an interim classification until one of the other VRM class objectives can be reached through rehabilitation. In this case, the class objectives should be for VRM Class II, the category of the surrounding landscape. The inventory process normally does not document smaller areas of divergence, such as the mine that you pointed out. Because the class objective is the same as for other Class II areas, however, the analysis remains correct as documented.

Revegetation is only one method to consider when rehabilitating the landscape for visual resource management. The major impact of surface mining would be the change in landform that contrasts with the natural landscape of unmined areas. Such landform restoration may be impractical because of the huge volumes disturbed. Revegetation may create more impacts until the lines, colors, and textures of the revegetation efforts are in harmony and in character with the prior and existing indigenous vegetation.

32-4 The number of viewers of the areas that would be disturbed and the duration of view are important from viewpoints across the valley to the west and south.

32-5 The southwest slope of the Roan Cliffs was excluded for avoidance of visual resource impacts. The recovery of the remaining tar sand would probably be more costly.

32-6 BLM has consulted with Utah Division of Wildlife Resources (UDWR) officials, and their views are reflected in the mitigating measures outlined in this EIS.

32-7 The time restrictions listed for protecting deer fawning areas are taken from the Price River Management Framework Plan (BLM 1983g) and are in force for the Sunnyside area. The authorized officer, however, could change these date restrictions in consultation with UDWR if circumstances at the time of disturbance would allow project activity without affecting animal populations.

32-8 Seed mixtures recommended for reclamation in wildlife habitats should include only native species. These species will be stipulated in the reclamation plan for this project.

Reclamation of wildlife habitats for enhancement cannot be justified if no significant habitat losses are involved. BLM can require enhancement only to mitigate a loss. Because no significant habitat losses are expected to occur in the Sunnyside STSA, enhancement cannot be required. If the seed mixture improves the habitat, this improvement is an incidental benefit

32-9 Each of the six points you mentioned is addressed below.

(1) The only residual impacts expected from proposed development would involve exceedances of the TSP PSD increments and the TSP NAAQS. Mining would account for over 70 percent of the particulate emissions. Thus, the type of extraction would little affect residual TSP impacts. The reference to a hot water extraction process has been changed.

(2) Because tailings operations would contribute 20 percent of the particulate emissione, a 20 percent reduction in TSP may be expected if tailings are hauled via pipelines.

(3) Drilling would account for less than 1 percent of particulate emissions and was assumed in the air quality analysis.

(4) Blasting would contribute less than 1 percent of particulate emissions and was not a major factor in the air quality analysis.

(5) Many of the emission factors used in the analysis agree with those given in the Mono Power Company Plan of Operations. Thus, we believe they represent the characteristics of the tar sand deposits.

RESPONSES TO COMMENT LETTER 32 (Continued)

(6) Consultation and coordination were integral parts of the project. Throughout the analysis, BLM consulted with Region VIII of the Environmental Protection Agency, the National Park Service, and the Utah Bureau of Air Quality, among others. The nature of the analysis did not warrant the use of refined air quality models. Models used in this screening analysis are EPA-recognized, state-of-the-art screening models and procedures.

NEPA makes no specific recommendations on algorithms or procedures, so those found most suitable for this study were used. VALLEY is a guideline model. RPM and MESOPUFF were developed under EPA sponsorship, have been discussed in the literature, and have been frequently used. The remaining procedures are state-of-the-art in air quality assessment and have performed well given the data constraints.

Actual exceedances, if any, would be determined at the PSD permit stage. Exceedances assumed for analysis were based on the best existing information.

32-10 EPA is considering adopting an air quality standard for inhalable particulates (IP), which are a subset of the particulates included in the TSP standard. The IP particulates have smaller diameters than those now considered under TSP. This EPA proposal could have great implications for all fugitive emission sources, including surface mining of tar sand. Because mines typically emit large particulates, fugitive dust impacts would likely be reduced on the basis of this new significance criterion. For more information, see page 28 of the Air Quality Technical Report (Aerocomp Inc. 1983).

32-11 See response to comment 4-1.

32-12 As stated in Section 3.A.4, Wildlife, the Utah Division of Wildlife Resources has complete authority over wildlife licensing, season dates, and bag limits.

32-13 Item 3 of Appendix A-4, Transportation Networks, has been reworded.

32-14 The intent of the measure is to coordinate signals, where feasible, and to use standard highway signs when needed for safety. Highway signs, such as destination distance markers, company signs, and other information signs, should be planned in harmony where discretion is permitted.

32-15 See response to comment 4-1.

32-16 This suggested measure is in the uncommitted mitigation measures section. It is thus not a firm stipulation but only a suggestion to the decision maker. That Chevron Resources Company has a policy of discipline along these lines does not preclude the need to suggest having this measure for other companies.

32-17 Mitigation measure 4 under Soils, Vegetation, and Reclamation has been changed to allow for exploratory work on a case-by-case basis.

Comment Letter 33

Mono Power Company

P O BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

January 26, 1984

Mr. Gene Nodine
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Re: Sunnyside Combined Hydrocarbon Lease Conversion Environmental Impact Statement

Dear Mr. Nodine:

We have reviewed a draft environmental impact statement entitled "Sunnyside Combined Hydrocarbon Lease Conversion." In response to your invitation for comments, Mono Power Company ("Mono Power") is submitting the following general comments contained within this cover letter. In addition, and as an attachment to this letter, we are enclosing a page by page commentary which points out inaccurate citations and suggested textual changes.

Introduction

As an introduction to our comments it should be noted that Mono Power submitted to the BLM both a notice of intent to convert its leases (January 1982) and a plan of operations (December 22, 1982) in accordance with the Combined Hydrocarbon Leasing Act of 1981 and regulations promulgated thereunder. The BLM has found the plan of operations to be complete within the meaning of the regulations.

The Combined Hydrocarbon Leasing Act provides that an applicant for lease conversion shall be entitled to receive a converted lease upon approval of a plan of operations which assures reasonable protection of the environment and diligent development of the tar sand resource. 30 U.S.C. § 226(k). Thus, the only decisions to be made by the BLM (i.e., the proposed "Federal actions" giving rise to the Sunnyside draft EIS) are determinations of whether each separate plan of operations submitted for lease

conversion meets the statutory test. Each plan must be approved or rejected on its own merits.

In addition to its plan of operations, and in response to direct requests from the BLM, Mono Power has prepared and submitted extensive additional information relating to resources in the Sunnyside area and the activities proposed in the plan of operations for the purpose of assisting in the preparation of the Sunnyside EIS. These additional submittals included a response to a BLM project "questionnaire" submitted in March of 1983, a detailed response to environmental engineering requests submitted on March 31, 1983, and comments on preliminary drafts of Chapter 1 of the EIS submitted in June and August 1983. Many of those comments still apply and should be helpful in finalizing the EIS.

Concurrently with the foregoing, Mono Power has continued its exploration, resource definition and pre-baseline study activities for the purpose of collecting the data necessary to further refine and carry out the plan of operations. These activities were carried out under the supervision and with the approval not only of the BLM, but also of the appropriate state water, reclamation and wildlife agencies. Local county and community governments have also been kept informed of Mono Power's plans and activities.

During this period Mono Power, at the invitation of the BLM, has attended EIS steering committee meetings, has made its contractors and consultants available to the BLM, has provided the BLM with resource and environmental data developed by Mono Power and has contacted the BLM directly on several occasions, all for the purpose of providing the BLM with the most accurate, complete data available for use in preparing the Sunnyside EIS. Unfortunately, much of the data provided by Mono Power appears to have been disregarded by the BLM in favor of unfounded and unrealistic extrapolations and hypotheses: Specific development procedures and impact data have been ignored; mining methods have been changed; the amounts of projected land disturbance have been doubled (which in turn doubled the projected environmental impacts attributed to our plan of operations); and the plan of operations described in the EIS no longer resembles the plan which we originally submitted.

EIS Analysis

These comments are presented in two parts. This cover letter will present the major concerns of Mono Power in a general manner; detailed comments follow as an attachment to this letter.

Mono Power's major comments center around the following issues:

- The worst case assumptions are not a reasonable representation of a foreseeable development for tar sands;
- The Sunnyside DEIS is not consistent with the Utah Combined Hydrocarbon Regional Draft Environmental Impact Statement ("Regional DEIS");
- The Partial Conversion Alternative, if implemented with the exclusion criteria as presented, would prohibit development of Mono Power's leases; and
- The mandatory mitigation measures described are often arbitrary and inflexible. and do not allow for mitigation of impacts on a site specific basis.

Worst Case Assumptions

The Sunnyside DEIS has assumed that all of the acreage applied for would be disturbed. Utilizing Mono Power's application, more accurate figures can be discussed and utilized. Mono Power proposes to disturb about 7,600 acres. The Sunnyside DEIS assumes 14,400 acres, doubling the projected disturbances. That is simply not a reasonable projection.

Mono Power submitted a plan of operations which has been reviewed and deemed to be complete. In that plan, mining was projected on lands which had sufficient resource available to support a major commercial project. Areas where tar sand exists but is not believed to contain sufficient bitumen and areas where tar sand is not as likely to exist were not projected for disturbance. Mono Power does not believe that projecting disturbance by mining on areas with no probable resource to be mined is reasonable, particularly where the mandatory mitigation measures of the same DEIS would prohibit development of large portions of the project area.

Mono Power understands the need to project worst case impacts based on a specific yet conceptual level of development. However, that projection should be reasonable in scope. Mono Power's plan of operations is designed to efficiently recover the tar sand resource based on presently available data. While we cannot say, with certainty, that any particular tract does not have tar sand resource value, until extensive additional exploration has been conducted, it is quite unrealistic to project that all of the lease acreage will contain recoverable resource. The inaccuracy of this projection is compounded by the apparent assumption that all tar sand would be recovered by surface mining. Even if tar sand is

found to exist in recoverable quantities, where the tar sand-bearing formations are known to lie at greater depths, recovery would be attempted through in-situ methods with comparatively little surface disturbance.

The over-estimation of disturbance is significant because the error is compounded in later chapters of the Sunnyside DEIS inasmuch as many impacts are directly attributed to the amount of surface area disturbed. Therefore, the overestimation of land disturbance creates unrealistic and hypothetical impacts which have crossed the threshold of environmental significance based upon land disturbance assumptions which do not correctly describe Mono Power's submitted plan of operation.

Mono Power recommends that either the acreage projected in the plans of operation be used or that a more realistic worst case be developed based on the plans of operation submitted by the lease conversion applicants.

EIS Tiering Consistency

The Sunnyside DEIS and the Regional DEIS are tiered documents under NEPA. As such, environmental analysis is performed in both documents for the same projects on the same properties. Impacts therefore should be the same in the two documents, or at least of the same order of magnitude. Instead of being consistent, complimentary, and tiered with one another, the two documents contain significant inconsistencies. Mono Power believes that the two documents in their final form must be consistent, complimentary and tiered. Our detailed comments point out many of these inconsistencies, including:

Threatened and endangered species: The Regional DEIS strongly indicates that no threatened or endangered species are believed to exist in the project area, while the Sunnyside DEIS projects significant impacts, assuming sensitive species may be found to exist.

Projected disturbance calculations: Additional projected disturbances in the Sunnyside DEIS are greatly over-estimated in comparison with the same projected disturbances cited in the Regional DEIS.

Impacts to wildlife habitat: The Sunnyside DEIS projects much larger impacts to non-endangered but nonetheless sensitive wildlife habitat when compared to the corresponding portions of the Regional DEIS.

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Lease stipulations and required mitigation: The lease stipulations and required mitigation in the Regional DEIS allow for site specific mitigation and more closely follow the Price River Area Management Framework Plan while the Sunnyside DEIS neither follows the Price River Area Management Framework Plan nor does it allow for mitigation. Such site specific flexibility and mitigation potential must be considered.

Partial Conversion Alternative

While a partial conversion alternative is conceptually a realistic alternative for consideration, as presented in the Sunnyside DEIS, it is not a feasible alternative for several project proponents, including Mono Power. The exclusion criteria described in the EIS (whether imposed through refusal to convert leases or through restrictive lease stipulations) would constrain much of the known resource from development. If mitigation of impacts is not allowed, visual resource protection and protection of watersheds will prohibit development by Mono Power. Mono Power believes that the analyses performed for exclusion purposes were inaccurate and overly restrictive, and that the concerns addressed can, in all cases, be successfully mitigated through the utilization of existing technologies.

The Combined Hydrocarbon Leasing Act provides that an applicant "shall be entitled" to lease conversion upon approval of a plan of operations which assures "reasonable protection" of the environment and "diligent development" of the tar sand resource. The partial conversion alternative, as presently written, arbitrarily negates this statutory entitlement.

Mono Power suggests that the final Sunnyside EIS reflect more strongly the fact that the exclusion criteria discussed are just some of the factors which will be considered by the BLM in converting leases and that mitigation of impacts will be encouraged to allow development while assuring "reasonable protection" of the environment.

Mandatory Mitigation Measures

Many of the required mitigation measures contained in the Sunnyside DEIS contain arbitrary threshold levels which are not supportable. Examples include:

- Imposing various buffer zones around raptor nests which do not consider topography and seasonal use patterns;

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- Arbitrarily requiring mining to be halted once 25% of the surface area of a lease is disturbed;
- Requiring settling ponds to be cleaned several times a year; and
- Arbitrarily limiting development of large areas during the only seasons of the year when development could reasonably proceed.

It is interesting to note that the mandatory mitigation measures of Chapter 4 of the Sunnyside DEIS, which measures would severely limit or prohibit any development if implemented, are contained in the same document which projects surface disturbance of every acre proposed for conversion. These measures, which will purportedly be required in any lease conversion, do not reflect the current management practices of the state and local BLM offices as indicated in the Price River Area Management Framework Plan and would prohibit many activities which are currently being permitted and successfully conducted without adverse environmental consequences in the project area. In addition, not only are the stipulations inconsistent with those of the local management framework plan, they are also inconsistent with the management policies reflected in the Regional DEIS.

These measures preclude any exploration and development on all but the least attractive resource locations during all but the most adverse seasons of the year. The DEIS document does not allow for any further study to determine the accuracy of the underlying assumptions, and does not permit mitigation of actual impacts should further studies show that adverse impacts are in fact likely to occur.

Mono Power recommends that the mandatory mitigation measures be deleted from the final EIS. Such measures should be jointly developed on a site specific basis by the persons charged with managing the affected resources and each project proponent. Mitigation which assures reasonable protection of the environment consistent with the BLM's Price River Area Management Framework Plan should be allowed.

Conclusion

We appreciate the opportunity to submit these comments, and hope that they will be helpful in correcting specific shortcomings of the Sunnyside DEIS, and, more importantly, in reestablishing the proper perspective on the decision to be made (which should be the primary focus of the EIS): "Does the plan of

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operations proposed by Mono Power Company meet the test of the Combined Hydrocarbon Leasing Act?"

If you would like us to discuss any of the foregoing concerns or any of the specific comments contained in the enclosed attachment in greater detail, or if we can provide you with any further information, please feel free to call me at (818) 572-2752.

Sincerely,

Wayne R. Gould

Wayne R. Gould
Project Manager, Tar Sand

0986h

Introduction

Mono Power has completed a detailed review of the Sunnyside DEIS and herewith submit our comments. Initial comments were previously submitted in June and August of 1983, on the contents of the Sunnyside DEIS Chapter 1. Many of these comments still apply and should be included in the Sunnyside Final Environmental Impact Statement (FEIS).

Mono Power's major comments center around the following issues:

- Approach

  The purpose of the Sunnyside DEIS is to support decisions to be made by the BLM under the Combined Hydrocarbon Leasing Act of 1981 on whether specific applications for lease conversion meet the test of the Act: "Does the proposed plan of operations assure diligent development of the tar sand resource and reasonable protection of the environment?" The decision must be made separately on a case-by-case basis with respect to each conversion application which has been filed. If a proposed plan of operations meets this test, then the applicant is entitled to lease conversion. Conversely, if a proposed plan of operations fails to meet either part of this test, no lease will be issued.

  In order to determine whether any application for lease conversion meets the test of the statute, it is necessary to consider the potential cumulative impacts of all proposed lease conversions. In so doing, however, the EIS seems to lose sight of the fact that several separate but related decisions will be made, and appears instead to treat the Sunnyside conversion process as if only a single action or decision will be required. The Sunnyside DEIS fails to recognize that stipulations or mitigation measures which may be appropriate in the specific circumstances involved in one application may not be as important or even necessary in another case. The Sunnyside DEIS also fails to recognize that mitigation measures which might have been appropriate based on projected cumulative impacts if all of the applications were approved may not be necessary if the BLM determines that one or more of the pending applications should be rejected.

  33-1 Mono Power believes that each section of the Sunnyside DEIS should be rewritten to more clearly indicate the separate nature of the decisions which must be made on the various applications, to acknowledge that the anticipated mitigation measures may vary from one lease to the next, and to recognize that the need for measures designed to mitigate projected cumulative impacts will be reduced to the extent the BLM ultimately decides to deny one or more conversion applications in the Sunnyside area.

- Worst Case Assumption

  The Sunnyside DEIS has assumed that all of the acreage applied for would be disturbed. Utilizing Mono Power's application, more accurate figures can be discussed and utilized. Mono Power proposes to disturb about 7,600 acres. The Sunnyside DEIS assumes 14,400 acres,

doubling the projected disturbances. That is simply not a reasonable projection.

Mono Power submitted a plan of operations which has been reviewed and deemed to be complete. In that plan, mining was projected on lands which had sufficient resource available to support a major commercial project. Areas where tar sand exists but is not believed to contain sufficient bitumen and areas where tar sand is not as likely to exist were not projected for disturbance. Mono Power does not believe that projecting disturbance by mining on areas with no probable resource to be mined is reasonable, particularly where the mandatory mitigation measures of the same DEIS would prohibit development of large portions of the project area.

33-2 Mono Power understands the need to project worst case impacts based on a specific yet conceptual level of development. However, that projection should be reasonable in scope. Mono Power's plan of operations is designed to efficiently recover the tar sand resource based on presently available data. While we cannot say, with certainty, that any particular tract does not have tar sand resource value, until extensive additional exploration has been conducted, it is quite unrealistic to project that all of the lease acreage will contain recoverable resource. The inaccuracy of this projection is compounded by the apparent assumption that all tar sand would be recovered by surface mining. Even if tar sand is found to exist in recoverable quantities, where the tar sand-bearing formations are known to lie at greater depths, recovery would be attempted through in-situ methods with comparatively little surface disturbance.

The over-estimation of disturbance is significant because the error is compounded in later chapters of the Sunnyside DEIS inasmuch as many impacts are directly attributed to the amount of surface area disturbed. Therefore, the overestimation of land disturbance creates unrealistic and hypothetical impacts which have crossed the threshold of environmental significance based upon land disturbance assumptions which do not correctly describe Mono Power's submitted plan of operation.

Mono Power recommends that either the acreage projected in the plans of operation be used or that a more realistic worst case be developed based on the plans of operation submitted by the lease conversion applicants.

- EIS Tiering Consistency
  The Sunnyside DEIS and the Regional DEIS are tiered documents under NEPA. As such, environmental analysis is performed in both documents for the same projects on the same properties. Impacts therefore should be the same in the two documents, or at least of the same order of magnitude. Instead of being consistent, complimentary, and tiered with one another, the two documents contain significant inconsistencies. Mono Power believes that the two documents in their final form must be consistent, complimentary and tiered. Our detailed comments point out many of these inconsistencies, including:

- Threatened and endangered species: The Regional DEIS strongly indicates that no threatened or endangered species are believed to exist in the project area, while the Sunnyside DEIS projects significant impacts, assuming sensitive species may be found to exist.
- Projected disturbance calculations: Additional projected disturbances in the Sunnyside DEIS are greatly over-estimated in comparison with the same projected disturbances cited in the Regional DEIS.
- Impacts to Wildlife Habitat: The Sunnyside DEIS projects much larger impacts to non-endangered but nonetheless sensitive wildlife habitat when compared to the corresponding portions of the Regional DEIS.
- Lease stipulations and required mitigation: The lease stipulations and required mitigation in the Regional DEIS allow for site specific mitigation and more closely follow the Price River Area Management Framework Plan while the Sunnyside DEIS neither follows the Price River Area Management Framework Plan nor does it allow for mitigation. Such site specific flexibility and mitigation potential must be considered.

- Partial Conversion Alternative
  While a partial conversion alternative is conceptually a realistic alternative for consideration, as presented in the Sunnyside DEIS, it is not a feasible alternative for several project proponents, including Mono Power. The exclusion criteria described in the EIS (whether imposed through refusal to convert leases or through restrictive lease stipulations) would constrain much of the known resource from development. If mitigation of impacts is not allowed, visual resource protection and protection of watersheds will prohibit development by Mono Power. Mono Power believes that the analyses performed for exclusion purposes were inaccurate and overly restrictive, and that the concerns addressed can, in all cases, be successfully mitigated through the utilization of existing technologies.

33-3 The Combined Hydrocarbon Leasing Act provides that an applicant "shall be entitled" to lease conversion upon approval of a plan of operations which assures "reasonable protection" of the environment and "diligent development" of the tar sand resource. The partial conversion alternative, as presently written, arbitrarily negates this statutory entitlement.

33-4 Mono Power suggests that the final Sunnyside EIS reflect more strongly the fact that the exclusion criteria discussed are just some of the factors which will be considered by the BLM in converting leases and that mitigation of impacts will be encouraged to allow development while assuring "reasonable protection" of the environment.

o Lease Stipulation
The Sunnyside DEIS, as presently written, is based on available, but admittedly incomplete, resource information. Much remains to be learned in the course of development of the Sunnyside tar sand deposit relating not only to the deposit itself, but also as to the nature and extent of other resources in the area. Nevertheless, the Sunnyside DEIS, particularly in Chapter 4 and in Appendix A-3, adopts arbitrary, inflexible positions which will preclude rational management decisions to optimize resource protection and development by the authorized BLM managers as resource information is developed, and may even prevent development of the resource. When viewed in the context of the specific conversion applications which must be approved or disapproved by the BLM, these apparently mandatory mitigation measures, although possibly viable under some theoretical overall leasing scheme, would prevent conversion based on the specific plans of operations which have been submitted for the specific tracts of land involved.

Mono Power believes that it is inappropriate to include mandatory mitigation measures such as those set out in the Sunnyside DEIS in an environmental impact statement. Such inclusion either presupposes that the important decisions have already been made (in which case the environmental impact statement is pointless), or that the decision-maker may ignore the mandatory measures in, or the fundamental assumptions of, the EIS (in which case the decision could not be supported or defended based on the EIS).

If such mitigation measures are to remain in the Sunnyside DEIS, then the applicable sections should at least be rewritten to indicate that these are the types of measures which might be considered on a case-by-case basis, as needed. Every effort should be made to avoid adopting positions at this early stage in the study and development of the Sunnyside area which would unnecessarily preclude otherwise desirable options in the future.

Detailed comments follow in the main body of the submittal. To assure that Mono's comments can be referenced to the Sunnyside DEIS document a comment numbering system has been developed. The system designates chapter or section by number or appropriate letter, page, column (1 or 2) and paragraph. For example:

```
            column
            /
      3-63,2,3
     /   \     \
chapter  page  paragraph
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Referencing the Sunnyside DEIS then, this example would reference a comment on cropland losses due to population expansions. A written statement then follows each comment number.

Cover Sheet
Sunnyside Combined Hydrocarbon Lease Conversion
Environmental Impact Statement

General comments on this section center around disturbance acreage as submitted in the Sunnyside DEIS which are not supported by plans of operation as submitted by the lease applicants. Mono Power submitted a Plan of Operations which has been reviewed and deemed to be complete. In that Plan, mining was projected on lands which had sufficient resource available to support a project. Areas where tar sand exists but which may not contain sufficient bitumen and areas where tar sand does not appear to exist were not projected for disturbance. Mono Power does not believe that projecting disturbance by mining on areas with insufficient resource is reasonable.

Mono Power, therefore, recommends that either the acreage projected in Mono's plan of operation be used or a more reasonable worst case be developed.

Specific comments are listed below:

33-5 C-2-4: A total disturbance level of 35,945 acres is projected. This figure is not supported by the plans of operation submitted by the lease applicants. The cover sheet should state that the projection is based upon BLM assumptions and not on industry plans of operation. Likewise, all subsequent references to this projection in the document should be qualified with the statement that it is a BLM assumption.

33-6 C-2-4: What is the basis for the statement that reestablishment of vegetation will be inadequate in low precipitation zones? This conclusion is unsupportable. The spent sand disposal areas for Mono Power are located in Climatic Zone D on Map 3-2 of the DEIS. This zone has an average annual precipitation rate of 14-18 inches and 60-120 days of frost-free weather. Proven reclamation techniques are currently being used in similar situations and climatic zones. These techniques are adequately reestablishing vegetation. In addition to responding to this comment please see subsequent comments for more detail.

33-7 C-2-5: There is a potential that some habitat "could" be lost for 100 years. Current reclamation practices, however, achieve pre-construction production levels much more quickly. This statement should be deleted and replaced with:

"Habitat losses will last until forage production on reclaimed lands reaches a level which will support preconstruction wildlife populations."

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Summary

33-8 Mono Power is concerned that the summary conclusions are not consistent with BLM's approved Management Framework Plan (MFP). Additionally, conclusions reached in the summary are also inconsistent with Regional DEIS conclusions.

33-9 Mono specifically objects to unitized development, as described in this document, at this time since there is little commonality in the development goals or processes of the various leaseholders. To compare the impacts of a 50,000 barrel/day alternative to the 115,000 barrel/day production rate proposed by leaseholders is inconsistent and should not be called an "advantage".

Specific comments are listed below:

33-10 S-2, 2, 1: It is assumed in the Sunnyside DEIS that the coal industry will recover and eliminate the relatively high current level of unemployment. Does this assumption agree with coal industry forecasts? If not, what is it's basis? If the assumption of a recovery of the coal industry is not accurate, what will be the impact upon the local communities? It is recommended that the impacts of tar sand development be considered with and without a healthy coal industry.

33-11 S-2, 2, 3: For the purposes of impacts to soils and vegetation, it is assumed in the Sunnyside DEIS that "reclamation programs would be successfully implemented by the applicants." This statement is not consistent with the statement on the cover sheet which projects: "inadequate reestablishment of vegetation in low precipitation zones". The 3,000 acres of disturbance in low precipitation zones B and C will annually receive 8-12" and 12-14" of rainfall, respectively. They also make up less than 10% of the total acres projected to be disturbed by the BLM. The main block of the STSA, where mining will occur, is composed of climatic zones D, E, and F which annually receive 14-18", 16-20", and 20-30" of rain, respectively.

Mono Power believes that vegetation can effectively be reestablished to preconstruction levels of diversity, cover, and productivity and that the assumption of successful revegetation should be consistently utilized in the FEIS. Therefore, Mono Power requests that the Cover Sheet be changed to reflect the conclusions of the impacts analysis section.

S-3, 1, 3: Projection levels related to significant impacts to visual resources are inaccurate. Refer to subsequent comments on impacts.

33-12 S-4, 1, 3: 933 acres of irrigated cropland are projected to be converted to urban uses as a result of tar sand development. It is unlikely that at this time specific acres can be projected for development. Therefore, what is the basis for these projections and how were specific acres chosen for development. If this is a BLM assumption it should be so qualified.

33-13 S-4, 1, 4: In the Cultural Resources section, strip mining is stated as the mining method to be utilized. None of the applicants will mine by strip mining methods. Mines will be open pit mines.

33-14 S-4, 2, 5: The Mitigation section addresses the level of mitigation assumed in the Sunnyside DEIS. Mono Power believes that the stipulation of mitigation plans and commitment to specific stipulations during the EIS process are inconsistent with NEPA and counterproductive, at this stage, in the leasing process. Lease conversion is provided for in the Combined Hydrocarbon Leasing Act of 1981, if the applicant receives approval on a plan of operations "which assumes reasonable protection of the environment and diligent development" of the resource. Mitigation plans should be a joint process between the leasing agency and the applicant on a site-specific basis. Mitigation stipulations and commitments over and above those committed by the applicants in their plan of operations should not be a part of the FEIS. For more detailed comments, refer to subsequent comments in the Appendices.

33-15 S-5, 2, 2: In the Socioeconomic section, it states that Utah Senate Bill 170 and the Carbon County permitting process (Ordinance #155, Article V) require developers of major projects to "...provide socio-economic mitigation in the form of prepayment of taxes and other advanced funding arrangements." This is incorrect. Section 4 of SB 170 states:

> "This chapter is designed to provide an additional mechanism for the alleviation of impacts on units of local government and is not intended to discourage the use of other mechanisms as may be available. Moreover, nothing in this chapter shall require a developer to prepay ad valorem property taxes or to make any other expenditure not otherwise required by law."

Ordinance 155 Section 5.4.2 requires major developers to submit assessment and mitigation plans which identify "...to the extent reasonably possible, methods, if any, to alleviate the perceived impacts on the infrastructure...". Neither of these documents requires specific mitigation measures. Rather they require that the developer propose alleviation measures as he may find appropriate to lessen adverse impacts. Such plans, of course, must be accepted by the responsible agencies. Mono Power requests that this misrepresentation of SB170 be corrected.

Chapter 1
Description of Proposed Actions and Alternatives

This section refers to inconsistences between the Sunnyside DEIS and the Regional DEIS. Mono Power urges that the two documents be brought into consistency with each other.

Proposed Actions should describe plans as submitted by the lease applicants and not describe a plan which has been developed internally by the BLM and which has not been proposed by any of the applicants.

Specific comments on this section include:

33-16 1-5, Map: The color codes for the Mono Power and Chevron-GNC lease conversions are the same on Map 1-1 and should be differentiated.

33-17 1-7, 2, 2: Twenty separate coal mines were included as interrelated projects for impact analysis. Mono Power believes that including all of these mines as firm developments grossly overestimates the impacts. The recent closure of the Sunnyside Mine for economic reasons would support this contention. What was the source of the information and what were the criteria utilized by the BLM in identifying these twenty projects as having "firm plans for development"?

33-18 1-9, 2, 3: The statement is made that under partial conversion only portions of the lease tracts will be converted. This is only one view of partial conversion. Another view which must be considered is conversion of all of some leases and no conversion of other leases. This view must be incorporated into the FEIS.

33-19 1-9, 2, 3: The last sentence on this page deals with the partial conversion alternative and states:

"It does not represent the applicants' views of potential project modifications, nor does it reflect any consideration of possible economic factors."

Mono Power emphatically agrees with that statement. On two separate occasions, Mono Power has commented upon the concept of the partial conversion alternative. Letters with comments and suggested changes were submitted on June 30, 1983, and August 26, 1983, to the EIS Project Leader. Those comments were not incorporated into the partial conversion alternative which will be discussed more fully in subsequent comments. Basically Mono Power feels:

- o Partial conversion is an alternative
- o Economics will be an important consideration
- o Specific exclusion criteria should not be utilized to define specific developed and non-developed areas, especially if mitigation is not allowed.

Please see subsequent comments.

33-20 1-10, Table: In Table 1-3, Footnote b, it states that Mono will have two secondary mill sites. Mono Power has proposed:

- o One extraction plant in the Range Creek drainage
- o One extraction plant in the Whitmore Canyon
- o One upgrading plant near Columbia

Please change the footnote to reflect Mono Power's submitted plan of operations.

33-21 1-12, 2, 3: The surface mining method described in the Sunnyside DEIS is conventional contour mining. All proposed surface mines are to be open pit mines. The FEIS should reflect the actual plans of operations.

33-22 1-12, 2, 4: Blast casting of overburden is described as the typical method for moving a portion of the overburden. Mono Power will not be utilizing this technique. Has it been proposed by other applicants as a typical method of mining? Figure 1-2, Typical Mining Sequence, is not a typical open pit mining sequence for the Sunnyside tar sand deposits. We would emphasize the need for consistency with proposed plans.

33-23 1-15, 1, 1: The drainage control system proposed for use is not a typical system proposed by Mono Power or normally used in open pit mines. Sediment structures normally are constructed away from and downstream of the overburden pile. They are not usually constructed in the waste material. Also water is normally ditched around the overburden and not routed under it in a ditch in the pit floor. It is recommended that this technique be deleted.

33-24 1-15, 1, 2: The Sunnyside DEIS states that final reclamation of the canyon fills will include "the sealing of the pile surfaces." Sealing of a surface such as this is not common practice for reclamation of waste rock. It can in fact be counterproductive by creating a slip zone between the overburden and reclamation subsoils and by creating a barrier to water movement. Mono Power does not propose to seal the surface of the overburden dumps. It is suggested that this technique be deleted.

33-25 1-15, 1, 5: Mono Power does not propose to deliver run-of-mine ore to the extraction plant. A primary crusher will be located at the mine. What other plans of operation include transporting run-of-mine ore directly? If none, this reference should be deleted.

33-26 1-15, 2, 6: In the second to the last paragraph "concurrently" should be changed to "countercurrently." The coarse sand is washed in a countercurrent manner with the solvent.

33-27 1-19, 2, 3: The discussion identifies three sites for spent sand disposal:

- o Canyon
- o Valley
- o Plain

From the discussion, it is unclear what the difference is between a canyon fill and a valley fill. Figures 1-1 and 1-7 do not portray a difference. What are the differences between these techniques?

33-28 1-22, Figure: The scale of Figure 1-8 appears grossly exaggerated and the concept is incorrect in that it does not portray current disposal techniques which incorporate terracing and reclamation. Does this figure correspond to the plans submitted by any of the proponents? If not, it should be deleted as inaccurate.

33-29 1-23, 2, 1: The Sunnyside DEIS discusses the conceptual nature of the planning process and the need to provide a worst-case impact analysis. Mono Power does not disagree with this concept. Mono Power, however, strongly disagrees with the assumptions of what the worst case is. In the Sunnyside DEIS the worst case is grossly overestimated in stating that all acreage will be disturbed. Mono Power recommends that throughout the FEIS a qualifying statement be included, which explains the relationship of the worst case assumption to the analysis being conducted.

33-30 1-24, 1, 3: The discussion relating to reclamation begins: "Because the applicant's reclamation plans are conceptual...." Mono Power does not believe that reclamation plans for the tar sand industry are conceptual. Mono submitted a detailed reclamation plan based upon proven techniques used in industry. On page A-7-7 of the Sunnyside DEIS, an evaluation of Mono's plan states that it is "thorough and very adequate" and that it "provides the necessary measures to ensure successful erosion control and reclamation of land disturbance." If this evaluation is correct, then it is improper to rate all the reclamation plans submitted as conceptual. Please qualify this statement.

33-31 1-25, Figure: Figure 1-9, while accurate in depicting a reclamation sequence, is not accurate in depicting techniques. This figure depicts strip mining, a method not proposed for removing tar sand by any of the lease applicants. The figure should be changed to more accurately represent open pit techniques for mining and reclamation or deleted entirely.

33-32 1-35, 2, 5: Mono Power Company does not propose to seed and mulch all inactive waste disposal piles. Erosion will be controlled by settling ponds. Waste piles will not be seeded or mulched until the area has been regraded and is suitable for final reclamation. This paragraph should be rewritten to more accurately describe Mono's plan of operations as submitted in the lease conversion application.

33-33 1-43, Table: Table 1-5 is an inaccurate accounting of the number of acres constrained or excluded by the partial conversion alternative. In Mono's case if the 6,922 acres are excluded or constrained too stringently, Mono Power would not have a developable resource. The 2,914 acres not affected do not contain significant or sufficient resource to support a major project. This alternative assumes incorrectly that the tar sand resource is spread uniformly over the deposit acreage and that if some acreage were to be excluded other acreage could be brought into production. Unfortunately, this is not the case and in fact BLM's arbitrary exclusion criteria comes very close to limiting the deposit to the point that development may be precluded.

33-34 1-42, 2, 2: The Bald Eagle Protection Act and Endangered Species Act are proposed as criteria to limit lands from development. It is doubtful that bald eagles utilize the STSA. Development near a golden eagle nest is allowed if proper regulatory procedures are followed. There is no basis for these criteria being utilized as exclusion criteria. Mitigation must be allowed.

33-35 1-42, 2, 2: The statement is made that no surveys of threatened or endangered species have been completed. The Regional DEIS on page 56 of Volume 1 states:

> "There are no officially designated critical habitats (as defined by the Endangered Species Act), concentration use areas, or nest sites in any of the STSA's."

33-36 Table 3-12 of the Regional DEIS identifies one golden eagle nest in the Sunnyside STSA. Figure 2-8 locates that nest north of the Whitmore Canyon tract.

Throughout the Regional DEIS there are discussions which are more detailed and definite than in the Sunnyside DEIS. Are there regional studies available which could be used for this analysis? The two EIS's need to be made consistent in their discussions and conclusions.

33-37 The Sunnyside DEIS locates 25 raptor nests shown on Map 3-40. What was the basis for that map? Is a study available? Is this map inconsistent with the statement that no surveys have been completed? The statement that no surveys have been completed contradicts the studies which located these nests and should be deleted.

33-38 1-43, 1, 1: The Coal Unsuitability Criteria pertaining to management of federal coal (43CFR 346H) only apply to coal and not to other minerals. The Coal Unsuitability Criteria allow for mitigation of impacts and exceptions to the criteria. Such flexibility must be allowed in the tar sands industry.

33-39 1-43, 1, 2: What is the regulatory basis for excluding livestock grazing and trailing areas? Certainly this is an impact which could be mitigated and is included in the multiple use policies of the BLM.

33-40 1-43, 1, 2: Map 3-2 is said to identify critical livestock areas. Are all areas identified as critical on that map critical to livestock? The map should identify the reason a given block is critical (i.e. trailing, grazing, isolation, water). Are disruptions "permanent," or will they be restored and thus mitigated. Mono Power does not feel this is a valid, supportable exclusion criteria and requests a justification or study basis for it's use.

33-41 1-43, 1, 3: What has the regulatory authority used to exclude public multiple use lands from development because of Visual Resource Management considerations?

Much of the "critical area" identified on Map 3-5 is behind Patmos Ridge and would not be visible to the valley communities west and south of the STSA.

33-42 1-43, 1, 5: The Sunnyside DEIS was published in November, 1983, following the 1983 field season. Did the 1983 survey locate any significant cultural resources? Will any lands be excluded because of the presence of cultural resources? Can the impacts be mitigated? Why weren't cultural resources addressed in the Sunnyside DEIS and available for public comment?

33-43 1-43, General: Mono Power believes that other criteria besides the arbitrarily selected exclusion criteria should be used in determining the partial conversion alternative leasing level. For example, socioeconomics should play a part. Likewise the location, quantity, and quality of the resource and the economics of the industry must be considered. The exclusion criteria used are incomplete and the FEIS must reflect these concerns. Please review previous comments made by Mono Power on June 8, 1983, and August 26, 1983, as well as subsequent comments within this document.

33-44 1-44, 1, 4: For the unitized development alternative it was assumed that 7,140 acres would be disturbed by spent sand disposal. This is the same number of acres projected under the worst case analysis of the proposed action. Both of the estimates are incorrect because they assume that mining will take place where insufficient tar sand to support mining are located. A more reasonable approach based upon the applicant's proposals should be utilized.

33-45 1-44, 2, 4: The No Action Alternative is not adequately addressed. The consequence of the No Action Alternative is that the leases would not be converted. Mono Power recommends that a more detailed analysis of the impacts of not converting leases be included in the FEIS. For example, what would be the loss of oil production to the nation; what would be the impact of the loss of jobs and tax revenue to the local communities?

33-46 1-45, 1, 2: It is untrue that no alternatives were eliminated from detailed analysis. The BLM did not take the applications at face value as the BLM stated. They eliminated the alternative proposed by the

33-46 (cont.) applicants in the plans of operations by assuming a BLM developed worst case alternative with over 13,000 acres of disturbance added to the plans of operations. The plans of operations were thus eliminated from detailed analysis.

33-47 1-47, Table: Table I-9 includes assumptions for the numbers of acres to be disturbed, 35,945 acres for the collective total. This value is significantly higher than the 22,554 acres proposed by the applicants. It is also inaccurate in that it projects mining of a tar sand resource in areas where reserves of tar sand do not exist. Then the assumption compounds the error by generating spent sand from nonexistent tar sand and disturbing additional acreage for disposal. These inaccurate disturbance projections are then utilized to project impacts upon the environment which are, consequently, inaccurate. Mono Power recommends that the Sunnyside FEIS utilize a more realistic worst case analysis and more strongly emphasize that the worst case impacts are based on BLM assumption's and not the submitted individual plans of operation.

Please refer to previous comments and additional comments within this submittal.

33-48 1-48, Table: Table 1-11 indicates that under the unitized alternative a total of 38,845 acres will be disturbed. If under unitized development the number of plants and ancillary facilities is reduced the projected disturbances for unitized development should be less that the 38,845 projected for the proposed action. The disturbance levels for the two alternatives should not be equal.

Chapter 2
Comparative Analysis

Again the "Proposed Action" alternative as developed by the BLM, significantly overstates impacts since all leased lands are assumed to be developed irrespective of actual bitumen resource present and disregards the applicants submitted plans of operations.

Specific comments include:

33-49 2-4, 1, 2: Under the partial conversion alternative, the Sunnyside DEIS states that development would proceed as proposed under the five plans of operation. This statement, as a general statement, may not be accurate. It is certainly not an accurate statement for Mono's proposed leases in as much as the tar sand resource remaining after application of the exclusion criteria may very well preclude the possibility of a commercial project. Without applying resource, mining, and economic criteria to a partial conversion alternative, Mono Power's reserves would not be developed.

33-50 2-6, 1, 1: In the comparison between the proposed action and unitized development, the impacts are projected to be significantly less for the unitized plan, at any one time. This is a rather narrow view of the 94 years of production for the unitized plan. Over the life of a unitized project, all of the areas targeted in BLM's Proposed Action would be mined. Therefore, the erosion hazard would be the same with time and reclamation would not necessarily be more successful, due to a smaller number of acres being reclaimed in any given year.

The environmental advantage of unitized development would be that the impacts, though not appreciably less, would be spread out over time. Perhaps this could be more clearly stated in this section.

Chapter 3
Affected Environmental and Environmental Consequences

Methodology used to arrive at the conclusions reached in Chapter 3 was not well documented. Chapter 3 states a number of conclusions reached which are in disagreement with those reached in the Regional OEIS.

Specific comments are as follows:

33-51 3-1, 2, 1: Basing leasing decisions, stipulations, and mitigation measures on the use of "professional experience" is of limited value. Technical decisions regarding the leasing alternatives in the Sunnyside OEIS should rely on factual data and its accepted subsequent analysis of that site specific data. At the very least the professional experience utilized should be documented to support the decisions.

33-52 3-1, 2, 2: The determination of significance should take into consideration the period of alteration and the possibility of restoration as well as immediate impacts.

33-53 3-1, 2, 3: The "distinct characteristics", as mentioned or alluded to in the Sunnyside OEIS, of each of the four watersheds should be presented in the form of chemical and physical parameters measured on each individual watershed. The quantified values could then be compared to the projected disturbed values attributed to each of the projects. At an early point in the EIS preparation the BLM sent representatives, at Mono's invitation, to Mono's water consultant to learn of the watershed characteristics in the Sunnyside area. We have found that none of the information that was transmitted at that time is visibly included nor for that matter was our consultant listed as an information reference. Please explain?

33-54 3-2, Table: Table 3-1 indicates that 1,327 acres of the Grassy Trail Watershed will be disturbed by Mono Power's disposal areas. Our own figures indicate that the area of this watershed disrupted at the time of maximum impact would be less than 400 acres. What was the basis for the BLM's figure? Does it include spent sand disposal and overburden disposal? If so, Mono Power's plan of operations proposes to locate the spent sand disposal area outside of the watershed in Rock Canyon. In all likelihood it reflects the BLM's every acre disturbed scenario in which case a qualifying footnote should be included.

33-55 3-2, Table: In Table 3-1, the total acres of main block of the STSA drained should be "97,976" not 98,976 as shown. Is this an arithmetic error?

33-56 3-3, 1, 2: Where does the 2.9 ton per acre (per year?) figure come from? Utilizing the data presented in Appendix A-2 for Grassy Creek Reservoir (D.A.=17.2 mi^2, Density=70 lb/ft^3, 200 ac-ft of sediment in 29 years, and a 100% value of 1350 tons per year) the 2.9 value appears inconsistent. The rate at Grassy Creek Reservoir does not apply to small upstream sub-basins where the rates and delivery ratios would

33-56 (cont.) vary a great deal. In addition the "49 tons/acre" figure should be justified or referenced. In quantifying impacts mine water control measures must be taken into account. Runoff from disturbed areas would be collected and only allowed to discharge when effluent limitations (usually more stringent than the base case) are met. By controlling disturbed runoffs, quality impacts are mitigated. To further mitigate runoff degradation clean water (undisturbed runoff areas) would be diverted around the proposed operation.

33-57 3-3, 1, 2: With the implementation of a properly designed water control system, sediment rates are not expected to significantly increase the sedimentation rates in Grassy Creek Reservoir. Water control systems are a part of Mono's submitted plan of operations and must be considered.

33-58 3-3, 2, 1: The sediment rate has nothing to do with the reliability of the water source. It is anticipated that the water quantity will not change to a measurable degree, and the long-term effects are predicted to be negligible with proper reclamation, from a quality and quantity standpoint.

33-59 3-3, Table: What is the source of the water quality data in Table 3-2 for Grassy Trail Creek? Table 3-5 of the Regional DEIS indicates the creek is considerably more saline than the 25D-4S1 mgl indicated (1,B1D-2,510 mg/1).

33-60 3-4, 1, 1: What is the basis for including spent sand disposal areas in the projections of impacts to Grassy Trail Creek? None of the projects propose disturbing the watershed by disposing of spent sand in the watershed. All spend sand disposal is outside the watershed. Potential leachate from spent sand disposal would be dispersed into at least three separate drainages. Spend sand disposal will not cause a TDS increase in Grassy Trail Creek. What is the basis that the BLM used to place spent sand in areas not proposed by the proponents? If 3 spent sands disposal areas are included in the impacts analysis to Grassy Trail Creek are they also included in the impacts analysis of the watersheds in which development is actually proposed?

33-61 3-4, 1, 2: Since vertical permeabilities and subsequent recharge rates will most likely be enhanced, deep aquifer flow to the Green River and Nine Mile Creek may be enhanced at least initially. Oepletion, as suggested, is doubtful since the same precipitation/recharge mechanism will exist. Over time, localized perched water tables and isolated confined/artesian conditions will most likely become reestablished creating springs and seeps. What is the basis for the conclusion that a decrease in deep water flow will result?

33-62 3-4, 1, 2: The temporary loss of springs and seeps does not effectively change peak flow rates. Springs contribute to base flows; peak flows are created through runoff situations resulting from intense precipitation events and/or snow melt.

33-63 3-4, 1, 2: Preliminary groundwater evaluations indicate that only localized areas of perched water tables and confined aquifers exist. Initial aquifer test results exhibit that hydrogeologic units which are saturated are extremely low in permeability.

Based on these hydraulic conditions, the proximity to the outcrop, the gradient of the potentiometric surface(s) and the unchanging source of recharge, mine dewatering will have little or no effect on deep aquifer(s).

33-64 3-4, 1, 2: Dewatering discharges (if any) would have to meet discharge specifications before being released. TDS concentrations would not change significantly with proper water control operations. What is the basis for assuming high TDS in the aquifer? The Regional OEIS states that groundwater quality is "thought to be good". Are the two documents consistent?

33-65 3-4, 1, 3: Reclamation would include the restoration of flood plains, as well as pilot channels designed for non-erosion velocities. In what cases would they be eliminated as stated in the Sunnyside OEIS?

33-66 3-4, 1, 4: Based on the generalized overview presented in the Sunnyside EIS, Mono Power feels that a determination of significant impact is premature and unfounded without site-specific data.

33-67 3-7, 1, 2: Water supplies to municipal watersheds would be temporarily delayed, but the reclaimed post mining watersheds are predicted to return to approximate premining hydrologic functions. Water quality is also expected to return to premining conditions. What is the basis for the BLM's conclusion?

33-68 3-7, 1, 3: In complying with the intent of P.L.294 and the General Withdrawal Act, a supplementary or replacement source of municipal water for domestic use could allow mineral extraction within the watershed set-asides. Alternate sources could include deep aquifer production and/or establishment of adjacent undisturbed watersheds. After reclamation, it is expected that the watersheds would again serve their intended use.

33-69 3-7, 1, 4: Public Land Drder 16 is stated in the Sunnyside DEIS as the authority which sets aside 3,680 acres of public lands for water resources. Public Land Drder 16 is dated July 21, 1942 and not March 19, 1919. In addition PLO16 has nothing to do with water resources, however it does withdraw lands in Arizona for an artillery range!

Executive Drder of withdrawal for Public Water Resource No. 16, dated March 14, 1916, sets aside the land in question. Perhaps this citation should be corrected in the Sunnyside FEIS.

33-70 3-9, 1, 1: The two adjustments to the analysis in the socioeconomic technical report make the data in the Sunnyside DEIS suspect. The proposed work force of the Chevron-GNC Project, for which adjustments

33-70 (cont.) have been made, is relatively large, and utilization of ratios for projecting impacts rather than through the socioeconomic models, could result in erroneous data. The adjustment of impacts to the year 1989 (peak construction work force), requires further modification of the data derived in the technical report.

Of the 20 coal mining projects included in the Sunnyside DEIS as interrelated projects, ten were not included in the technical report unless the names have been changed. Apparently this change (a 3rd unnoted change) also has been accounted for in the data; no basis is available by which to assess the socioeconomic impacts projected from these projects.

To what extent has the technical report been compromised as a result of the above adjustments?

33-71 3-9, General: The socioeconomic technical report referenced provides baseline socioeconomic projections which are, "...attempts to depict the direction current trends are likely to take in the area without tar sands development." Further, the technical report states that these baseline projections were made before the recent economic recession impacted the area, and that the recession has affected the validity of these baseline projections. The effects of the current recession should be considered in the FEIS since for example, Table 2.7 on page 2-30 shows total employment in 1985 for the impact area as 12,240. As of mid-December 1983, the Utah Department of Employment Security shows total employment as 8,540. Thus employment would have to increase more than 40% in 13 months for these baseline projections to be representative of actual conditions.

33-72 3-9, 1, 3: Why aren't the 20 coal projects, considered as interrelated projects in the Sunnyside DEIS, included in the baseline projections since baseline conditions are defined as anticipated trends without tar sand development?

33-73 3-12, 1, 2: To consider impacts to public services significant if they exceed the baseline by 10% or more is arbitrary. The degree of impact will greatly depend on the existing capacities of the systems. What is the basis for establishing 10% as the significance threshold?

33-74 3-13, 1, 3: Several statements made in the section on Personal Income seem illogical and are not at all consistent with the technical report. It is stated that the proposed tar sand projects would not increase the Per Capita Personal Income (PCPI) level of the area significantly (5%) over the baseline. While many more people are coming into the area, it is the mining and construction sectors which pay the highest wages of all the industrial sectors, where the greatest increases in employment will be occurring. Therefore, PCPI should increase substantially. Additional opportunities for secondary employment (retail, services, etc.) will also be created for "dual family" employment (employment of a second, third, etc., person in a family) which will help to boost PCPI.

33-74 (cont.) In Table 4.18 of the technical report, the projected PCPI's from the Proposed Action Scenario are given for the years 1985, 1990, 1995, 2000 and 2005. When compared with the baseline projections of PCPI given in Table 2.11 of the technical report, the impact projections exceed baseline projections from 15% to 43%. Even with the adjustments noted, the PCPI should not be affected so drastically as to be less than 5% above baseline.

Finally, the total increase in personal income in the area of impact as stated in the Sunnyside DEIS is $1,289 million (assumed to be above baseline and cumulative) as compared to the total calculated from the technical report of 592.4 million. Again the noted adjustments should not make such a difference.

33-75 3-14, 1, 2: The Appendix which explains the methodology used to derive the estimated Local Government Services and Facilities impacts (A-6-3) refers to the infrastructure service demands tables (Tables 4.20 and 4.21) of the technical reports. These tables are totally blank, so no evaluation of the projections can be made. Have the tables been subsequently completed and are they available for review?

33-76 3-18, 1, 4: In regard to local government finance, it is stated that, "...a majority of the additional (utility/service) capacity would be needed to meet the demands of the construction period..." However, Table 3-5 shows that, except in the case of Green River and the unincorporated areas near the Green River Census County Division, operations population impacts are greater than construction, so this statement cannot be true.

Continuing on this page, it is stated that "the largest part of the increased revenues from new developments would become available only after the building of mine operations." This is not necessarily true since Utah Code allows for mitigation.

Finally, it is stated that, "...newcomers would accrue largely to the counties, since the mines would be located in unincorporated areas, whereas much of the infrastructure costs would be borne by the communities." If this means that new developments would be located in county areas and would, therefore, contribute only to county revenues, there is no objection to this statement aside from lack of clarity. However, if it means that new residents would choose to locate in county unincorporated areas, objection is raised for the following reasons:

- o If newcomers are residing in the county, additional infrastructure wouldn't be required by communities.
- o The formula used in the SAM model distributes new residents by existing community population, as well as community distance from the job site. The statement that people will live adjacent to the job site is a conflict to the model.

33-77 3-18, 2, 3: The Sunnyside DEIS states, "...there could be long-term adverse effects from facilities becoming under-utilized tax burdens after population declines from peak levels." However, Table 3-5 (page

33-77 (cont.) 3-10) and the project manpower charts from the technical study show that the operations population will be higher than the construction population. Additionally on page 1-23 it states that, "...tar sand mining operations can be expected to have an ongoing project life of 74 years." The other projects (interrelated projects) cited in the technical study are shown to have a significant duration of 30+ years. Therefore, this statement regarding facilities becoming under-utilized tax burdens would project a more extreme picture than could actually be expected to happen with the phasing in and out of the various projects over a considerable length of time.

We suggest that this statement be removed.

33-78 3-20, 2, 5: The statement is made that, "quality of education could suffer if physical plants, personnel and maintenance funds are not available in a timely manner." Actually, the State of Utah finances education operations and maintenance on an equalization basis, so that state funds would be made available to help support these activities until the local districts' cash flows caught up with the need.

33-79 3-23, Table: The impacts estimated based upon the acreages in Table 3-9 are not accurate. The plans of operation projected that 22,554 acres of land, and therefore topsoil, will be disturbed, not 35,945 acres. We request that the fact that the projected disturbance is a BLM assumption be referenced.

33-80 3-24, 2, 1: Why would changes in topography result in surface expressions and aspect having less influence in vegetative growth? Is the sixth paragraph on this page consistent with that statement?

33-81 3-25, 1, 1: The slope required in the text is 30%. In Appendix A-7 it is 35%. The two requirements should be consistent, but should also be determined on a site-specific basis during the permitting process.

33-82 3-25, 2, 3: Cook is referenced as supporting the requirement for 12-18 inches of suitable plant growth material.

The publication title is "Rehabilitation of Land Disturbance Resulting from Oil Shale Development." The differences between spent shale and spent tar sand are considerable and would require different reclamation techniques. Oil shale techniques should not be arbitrarily required of the tar sand industry.

33-83 3-26, 1, 2: Why can only worst case impacts to vegetation be projected? On page A-7-7 the Sunnyside DEIS states concerning Mono's reclamation plan:

> "Compliance with the reclamation program as outlined provides the necessary measures to ensure successful erosion control and reclamation of land disturbance."

33-83 (cont.) The two statements are incompatible. Mono Power Company believes that reclamation of lands disturbed by mining and reclamation of spent sand will be successful if existing, proven technologies are utilized. There will be an impact to vegetation, but it should not be significant nor long-term.

33-84 3-26, 1, 3: The statement is made that it "might not be possible to establish a ground cover within five years." What is the basis for this? Climatic zones A, B, and C receive 6-10", 8-12", and 12-16" of precipitation annually. Mono Power believes ground cover can be established within five years if adequate reclamation techniques are employed in these climatic zones. The Regional DEIS supports that belief. On page 110, it states that "Vegetation would become established on most reclaimed mine spoils, including arid and semiarid areas, within 2-5 years (USDA, FS, 1979)." The two EIS's must be changed to be more consistent in their conclusions.

33-85 3-29, 2, 3: It is assumed in the Sunnyside DEIS that:

- o Plant diversity will be reduced;
- o The reduction is caused by a reduction in microenvironmental conditions; and,
- o Any reduction of plant diversity is bad.

Plant diversity may be reduced. However, reduction of the number of microenvironments available is only one possible cause. Other causes may be:

- Competition
- Seed mixture
- Seeding ratios
- Management practices
- Climate

A reduction in plant diversity of any degree, no matter how small, is not necessarily significant as the Sunnyside DEIS indicates. With careful selection of plant species and proper land management, the reduced plant diversity may be of more utility. Mono Power feels that reduction in diversity may not be significant. What is the basis for this assumption and significance criteria?

33-86 3-30, 2, 1: The significance criteria of 10% of the total available crucial habitat is unclear. Is the 10% figure related to the total number of acres of habitat within the boundaries of the STSA or the total number of acres of habitat available to the wildlife? How was the 10% cutoff derived? What is the technical basis for the 10% threshold value?

33-87 3-32, 1, 6: The conclusion that impacts to wildlife will be significant is based upon an incorrect assumption. Cumulatively 38,845 acres will not be disturbed. Please refer to the plans of operations for accurate disturbance levels or reference BLM disturbance assumptions.

33-88 3-32, 2, 4: What is the basis for the statement that vegetation on

33-88 (cont.) reclaimed areas will not be "established or productive for 20 years or more?" This statement is not consistent with the Regional DEIS. The two documents must be made consistent and consideration given to proven reclamation techniques.

33-89 3-33, 2, 2: The calculations upon which impact significance to the limiting habitat type, high priority summer deer range are based are incorrect, and thus the impacts are overestimated. On page 1-47, Table 1-10, is a list of the acres to be disturbed by the proposed actions. Based upon the applicant's plans of operations, 25,454 acres is the cumulative disturbance total. This cumulative total includes 6,000 acres to be extracted in-situ without significant surface disturbance, 2,900 acres of interrelated projects, and acreage outside the habitat type upon which spent sand will be placed. Even so, the 25,454 acres is 9.5% of the 266,944 acres available in Unit 27B. Utilizing the BLM's significance criteria of 100%, this impact is insignificant. If credit is given for the acres which won't have surface disturbance from in-situ recovery (60% Regional DEIS) for interrelated projects away from the STSA, for the disturbances outside of the habitat type, and for ongoing reclamation, the percentage disturbed and the significance will be further reduced.

33-90 3-33, 2, 2: The calculations utilized to determine significance are incorrect. 27,296 is 10.2% of 266,944 not 11%. 30,196 is 11.3% of 266,944 not 16%. Table 3-13 should be checked as well.

33-91 3-33, Table: The area of influence is reported to contain 88,926 acres of high priority summer deer range. Table 3-12 of the Regional DEIS, page 55, states that the Sunnyside STSA contains 31,384 acres of crucial summer deer range. The two DEIS documents are inconsistent and should be reconciled. Please reconcile the calculations for elk habitats as well. The same discrepancies exist for that species.

33-92 3-34, 1, 1: The comment is made that displacement of mule deer by mining "could result in population losses due to increased competition and stress." Since the "mule deer herds in this area are believed to be below carrying capacity" (p. 3-33) this displacement may not cause stress and competition.

33-93 3-34, 2, 1: A reduction of 2-11% of the mule deer in the unit is projected "if the nearby areas were at carrying capacity." Herd Unit 27B is stated to be below carrying capacity, at 10% of capacity. Are the nearby areas also below carrying capacity? If not, will there be a reduction in the herd? The Utah Division of Wildlife Resources should be consulted as to actual use and capacities and impacts projected based upon those figures for adjacent units and 27B. To assume that adjacent areas are at capacity without documentation is arbitrary.

33-94 3-34, Table: The Regional DEIS for the High Commercial Production alternative projects a total of 23,600 acres of crucial summer range will be disturbed. This does not relate to the 30,196 utilized in the Sunnyside DEIS. The two documents should be compatible.

33-95 3-35, 1, 5: What is the basis for the statement in the Sunnyside DEIS that 10% of the elk in the main block will be displaced? for the 23% potential?

33-96 3-35, 2, 1: The Range Creek elk herd is projected to be increased to 800 animals. The Regional DEIS states that the herd size is 40-60, and Table 3-12 of the Sunnyside DEIS gives the size of 100 animals. What is the current population? What is the population on the main block? Can the unit support 800 animals? Will a disturbance of 22,554 acres out of 199,296 be of significance considering that the unit is currently at 10% of carrying capacity?

33-97 3-37, 1, 2: An estimated 5,636 acres of agricultural land are projected to be converted to homesites and urban developments. On page S-4, 933 acres of irrigated cropland are projected to be disturbed. What is the basis for these projections? Are these projections realistic and supportable to the degree that a 60% reduction in game bird habitat can be projected?

33-98 3-37, 1, 5: It is calculated that tar sand and interrelated projects will disturb 9,980 acres of yearlong sage grouse habitat and an estimated 557 acres of nesting habitat. The Regional DEIS, on page 112, projects that at Sunnyside 5,264 acres of yearlong habitat and 2,236 acres of nesting habitat will be disturbed and that disturbance for all STSA's addressed will be 13,141 nesting and 5,264 yearlong. These numbers are inconsistent and should be made consistent between the two DEIS's.

33-99 3-38, 2, 4: The Sunnyside DEIS discusses impacts to endangered species including an 83% increase in wanton killing of bald eagles and a significant impact upon black-footed ferrets, if they exist on the STSA. The Regional DEIS on page 111 states:

> "Because there are no officially designated critical habitats or known concentration use areas or nest sites within any of the STSA's, no significant impacts to the northern bald eagle, peregrine falcon, or black-footed ferret would be expected to occur."

These conclusions are inconsistent. It is inaccurate and improper to project potential impacts to species not known to occupy the STSA. The Sunnyside DEIS should be modified to be consistent with the Regional DEIS conclusions. No documentation is presented to support the conclusions reached in the Sunnyside DEIS.

33-100 3-41, Table: On Table 3-14, the "Animals Harvested" column shows 6 Black Bear and 18 Mountain Lion. On page 3-40 it is stated that an estimated 23 animals were harvested. Which is correct? 24 or 23?

33-101 3-34, 2, 2: A statement should be made substantiating the adequacy of using old data (BLM, 1977) for making the Visual Resource Management (VRM) class determinations. A technical support document must be made

33-101 (cont.) available for review. It should explain how an old study was updated and utilized for this EIS.

33-102 3-43, 2, 3: "Area of significant impact" is not synonymous with total lease acreages since each of the development proponent's would disturb only the subpart of the lease where feasible on economic and engineering grounds. No rational is presented relating viewed area to disturbance area.

33-103 3-43, 2, 4: Designating all impacts as long term contradicts the statement made in Section 3.C.6 that "vegetative rehabilitation would occur within most areas, within the operational period of the project."

33-104 3-44, 1, 1: It is not possible to categorically state that "revegetation ... would not overcome the contrasts between the present natural and the proposed highly modified landscape." What is the basis for that statement?

33-105 3-44, 1, 1: The unsubstantiated statement "view from valley areas would be severely altered forever" is inconsistent with the "background" designation admitted in paragraph 1, p3-43, and, in the absence of documentation, is an unwarranted conclusion.

33-106 3-44, Table: It is obviously inconsistent that every existing lease acre would be "significantly effected" since in even the most diligent development scenario, not every acre would be disturbed.

The influence of the 1400 acres associated with interrelated projects on VRM classifications of immediately adjacent lands is not addressed. The development of the Chevron-GNC project located on neighboring private land will significantly affect the VRM classification.

33-107 3-44, General: State and federal regulations will not allow air quality impacts to exceed ambient air quality standards or PSO increments. If the projects cannot be designed and constructed in a manner to satisfy air quality regulatory requirements, the projects will not be built. Therefore, EIS impact assessments, based on sketchy data, which predict standard or PSO increment violation are erroneous. Would not the absolute worst case air quality impacts occur if the projected impacts equal the levels set by the standards or if the PSO increments are completely consumed?

33-108 3-47, 1, 3: The Sunnyside OEIS refers to monitoring results which supposedly show ambient TSP concentrations greater than the secondary annual standard and greater than the primary 24-hour standard. However, the data are not referenced and none of the counties included in the STSA have been designated by EPA as non-attainment for TSP.

Referencing the above comment, the Sunnyside DEIS states that the visibility in the area is good and partially attributes the good visibility to low TSP concentrations. This contradicts the previous paragraph. What is the source of the data and sampling site location?

33-109 3-48, Map: It is not clear whether the impact isopleths, Map 3-6, around Price and Wellington are the result of project-related emissions only or if they are a result of the total community emission burden. This should be clarified in the Sunnyside FEIS.

33-110 3-50, Table: The TSP modeling methodology (p.113, Argonne) is inadequate to simulate impacts of mining in an area of complex terrain. It appears that the model is a simple rollback method based in part on the relationship of air quality and emissions in populated areas. Data from populated areas are not appropriate for applying to the mine areas. In addition, the modeling technique does not incorporate dust containment with the mine nor does it include the effects of deposition of large particles produced by mining operations.

What was the basis for the model selection?

33-111 3-51, 1, 5: Analyses of acid deposition and visibility were made assuming coherent plumes following straight-line trajectories. In this rugged country such a scenario is not likely, especially for emissions from the plants located in deep canyons or at the foot of the Book Cliffs.

33-112 3-53, Table: The Uintah and Ouray Indian Reservation is not a Class I area. To group this area with designated Class I areas leaves the reader with the impression that it also is a Class I area and requires treatment as a Class I area. The Reservation should be differentiated from the Class I areas.

33-113 3-60, 2, 4: Impacts to cropland are considered significant if more than five acres of land would be irreversibly converted. Mono Power feels this is an unreasonable criteria. What was the basis for this threshold?

33-114 3-63, 2, 3: An estimated 2,826 acres of land are projected to be converted from cropland on this page. On page 3-37, 5,636 acres are projected. What is the difference between these projections? Which is correct? The two references should be consistent.

33-115 3-80, 1, 2: The disturbance totals utilized for partial conversion are incorrect. If exclusion criteria are applied as proposed, the partial conversion industry will not develop as proposed in the Sunnyside OEIS. Please refer to other comments concerning this problem.

33-116 3-86, 1, 1: This narrative discussion of significance is at variance with Table 3-33, where all VRM classes are listed as "significantly affected". This discrepancy should be rectified.

33-117 3-87, 1, 2: To say that no known fugitive dust control measures exist to fully mitigate TSP impacts is incorrect. Projects will employ necessary techniques as required by their permits. Technologies currently exist to control TSP concentrations to acceptable limits.

33-118 3-87, Table: Comparing Tables 3-34 and 3-18, the calculated SO^2 impacts for partial conversion are higher than those of the proposed action. There is also no change in impact levels for TSP and NO^2. In fact, calculated concentrations for TSP and NO^2 are higher for partial conversion for some averaging times. Therefore, is it not true that one must conclude that partial conversion will not improve air quality when compared to the proposed action?

33-119 3-107, 1, 5: "Significant visual impacts" are postulated to result from the unitized development scenario. The thresholds upon which significance-criteria are based should be identified.

33-120 3-107, 2, 1: "Although... vegetative rehabilitation would occur for most areas within the operational period of the project..." This statement which is true, is at direct variance with those made on pA9-5, second to the last paragraph, and with pA9-4" all impacts were considered to be long term."

No evidence is presented to conclude that "landform modifications... would not be restored to the present condition to blend with portions of the natural background." Such blending is clearly required in the plan referenced on pA3-5.

33-121 3-107, 2, 1: The statement "time needed for adequate revegetation to reduce the visual contrast to a satisfactory level would remain long term" contradicts the statement made at the beginning of the same paragraph that vegetative rehabilitation would occur for most areas within the operational period of the project." This statement should be made consistent.

33-122 3-108, Table: Table 3-45 and Map 3-11 do not match. Table 3-45 gives a maximum annual TSP impact of 149 ug/m^3, while Map 3-11 shows a maximum annual impact of 174 ug/m^3.

33-123 3-109, Map: The Sunnyside FEIS needs to clearly indicate whether the air quality isopleth maps represent the sum of calculated impacts and projected background values or just the calculated impacts.

33-124 Also the Chevron-GNC project is not located in the Reservation as indicated?

Chapter 4
Site Specific Mitigation, Monitoring, Unavoidable Adverse Impacts and Long Term Environmental Consequences

The lease stipulations and required mitigation in the Regional DEIS allow for site specific mitigation and more closely follow the Price River Area Management Framework Plan. The Sunnyside DEIS is much more specific, rigid, and does not allow for appropriate mitigation. Site specific flexibility and mitigation potential must be considered and the two EIS's must be made consistent with each other and the Management Framework Plan.

Specific comments are as follows:

33-125 4-1, 1, 1: Section 4A Site Specific Mitigation presents a list of 10 mitigation measures which will, in the words of the Sunnyside DEIS, be required by the BLM. This language presupposes that (1) the decisions regarding these measures have already been made and (2) that none of the concerns associated with these measures can be successfully mitigated by the District and Area Offices of the BLM who are charged with the responsibility of managing these multiple use public lands. As written Mono strongly advocates that this section be deleted. Comments on the specific measures supporting this recommendation follow:

33-126 1. Measure 1 misrepresents Public Law #294 in that it goes far beyond the requirements of that act as it pertains to the protection of the Sunnyside water supply during periods of mineral development. Examples of this include the requirements of (1) "complete" containment of any runoff water, mine waste, sediment or any other potential contaminant and (2) the ultimate approval authority which the BLM attributes to the town of Sunnyside but which by Public Law 294 is vested in the Secretary of Interior.

33-127 2. Measures 2 and 3 are at variance with each other in that one prohibits surface activity and occupancy while the other allows for it. Collectively they do not represent similar measures as indicated in the Regional DEIS.

33-128 3. Measure number 2 does not allow for the successful mitigation of potential surface activity impacts.

Mitigation Measure No. 2 would prohibit all surface activity on lands presently identified as public water reserves. The BLM is currently engaged in a review of all such water reserves in Utah, and has already determined internally that approximately 42% of the lands designated as public water reserves within the leases for which Mono Power has applied for conversion should be dropped from such designation. In other words, the Sunnyside DEIS proposed to prohibit any surface occupancy on potential combined hydrocarbon lease lands to protect water reserves which the BLM has already preliminarily concluded serve no useful purpose as water reserves.

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33-129 4. The measures require exploration and other developmental activity to occur during unreasonable seasons of the year and consequently under conditions which would bring about the max·mum detrimental environmental impacts.

33-130 Additionally these measures unreasonably restrict the utilization of resources without providing any additional protection to the environment which could not be satisfactorily provided through other means. They:

1. Preclude all exploration and development activities excepting during short seasons of any given year.

2. Are at direct variance with earlier findings of the Sunnyside DEIS in which it is stated that:

> "It was determined that the exploration phase would not result in any significant impacts to the environment. The impacts of the test mine and pilot plant phase of development are not presented, because this phase would be temporary and of short duration and its impacts would be encompassed by the impacts of commercial development."

3. Preclude future exploration activities which have historically been allowed and which have successfully been achieved while maintaining the harmony of the host environment under local BLM management.

33-131 4-1, 2, 4: The measure to prohibit occupancy on slopes in excess of 50 percent is too restrictive in that it prohibits facilities such as impoundments for soil or water. This does not allow for successful mitigation utilizing erosion control practices currently available.

33-132 4-1, 2, 6: Is the requirement to enhance off-site vegetation practical? Is it necessary? What types of enhancement techniques does the BLM propose? Mono Power is doing a wildlife habitat screening analysis utilizing Landsat remote sensing techniques. Initial data indicates that of the 31,364 acres classified 1619 acres were aspen forest and 4964 acres were mixed conifer and aspen forest. The classification of the 31,364 acres covered corridors around all areas projected for disturbance in the plan of operations from the Whitmore Canyon Tract down Range Creek to the Green River. On a more regional basis, of the 537,000 acres classified 12,000 was aspen forest and 33,500 was mixed forest. With 45,000 acres available and the big game herds significantly below the area carrying capacity, increasing capacity is of questionable value.

This measure precludes the condition or eventuality in which aspen is in succession to conifers or that it is unimportant to the wildlife community in which case forced or mandatory enhancement would be

33-132 (cont.) unnecessary. Furthermore this assumes that lands for off-site enhancement will be available which may not be true for private lands.

33-133 4-3, 1, 1: The measures prohibiting disturbances to wildlife habitat during certain times of the year are inconsistent between the Regional DEIS, Sunnyside DEIS, and the proposed amendments to the Price River MFP. They are also difficult to follow because they are presented in different ways. They should be clearly presented in a consistent fashion. Mitigation and flexibility must be allowed.

Development is Prohibited For This Period

Habitat	Regional DEIS	Sunnyside DEIS	Price River MFP
1. Sage Grouse	Apr.-June (p.68) Apr.-Mid June (p.71)	Apr.-Mid June (p.4-3)	Apr.-Mid June (p.50)
2. Deer Winter Range	Nov.-Mid May (p.73)	Nov-Mid May (p.4-3)	Nov.-Mid May (p.52)
3. Calving and Fawning		Mid May-Mid July (p.4-3)	
4. Deer Summer Range	Mid May-Mid July (p.7-4) Mid May-Oct. (p.74)	Mid May-Nov. (p.4-3)	Mid May-Mid July (p.54)

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33-134 4-4, Table: Table 4-1 is incorrect! Mono Power Company commits to perform baseline studies as necessary and appropriate in the disciplines outlined in both categories on the table. Ongoing impact monitoring in all disciplines is not a necessity.

33-135 4-8, Table: It is suggested that Wilderness Quality be classified as variable with Footnote E. Wilderness Quality is subjective much like the Quality of Life. Tar sands development will have very little direct impact upon wilderness values. An increase in the use of a given wilderness area may be viewed as either a positive or negative effect. In fact, the Desolation Canyon Wilderness Study Area Draft Site Specific Analysis projects that a designation of Wilderness will increase public awareness and therefore increase use of the Desolation WSA. It appears that there is an inconsistency in evaluating the effect of an increase in use between the two documents.

33-136 4-9, Table: What is the basis for the conclusion that the commitment to water resources is irretrievable? Water quality and quantity is expected to return to preconstruction levels. Water control systems, regrading, and reclamation are all designed to restore the water resources. Most of the resources discussed on this table are not irretrievable but with time will be restored.

Appendix A-1
Consultation and Coordination

No specific comments on this section.

Appendix A-2
Summary of Applicants' Plans of Operation and Impacts

Specific comments include:

33-137 A-2-12, Table: A total of 7,968 acres is listed as projected to be disturbed on "Very Steep Terrain." If the projected total disturbance on the previous page which includes all terrain is 7,614 acres, how can this happen?

Appendix A-3
Existing Oil and Gas Provisions and Required General Measures Designed to Reduce Impacts

33-138 Mono Power Company objects to the inclusion of lease stipulations in Appendix A-3. Existing State and Federal laws require protection of the environment and mitigation of impacts. The Price River Area Management Framework Plan is presently being amended to address lease stipulations and this amendment process is taking tar sand concerns under consideration. Therefore it is premature to identify specific stipulations as committed to in the Sunnyside DEIS. The Management Framework Plan process is the appropriate vehicle for development of lease stipulations.

Mono Power Company recommends that Appendix A-3 be modified to allow for continued development and future adaptations of the MFP. A-3 should state that for the purposes of impact analysis certain requirements were assumed. Included in those requirements are:

- o State laws
- o Federal laws
- o Price River Management Framework Plan

However, if the current appendix is utilized Mono Power offers the following comments concerning those specific commitments.

33-139 a A-3-1 and A-3-2, 2,3 and 2,3: References are made in two places to funding personnel for administration of Federal programs. Mono Power does not feel that an EIS is the proper place to approach funding and that those references should be deleted.

b A-3-3, 1, 4: The requirement that no maintenance roads along lineal facilities will be permitted is unreasonable. Maintenance of facilities, such as production conveyor belts and pipelines is necessary.

c A-3-4, 2, 2: All topsoil and suitable plant growth material are required to be conserved. This requirement should not apply in all areas. In open pit mining, subsoils or overburden may be a suitable plant growth medium, but they also may be tens of feet thick. It would not be necessary to conserve all of that material. This stipulation should require saving sufficient material to support the end land use.

d A-3-5, 1, 4: The requirement to provide a qualified paleontologist and to conduct an intensive survey of that resource is unreasonable. What is the basis for those requirements? Are paleontologic resources located or suspected on the leases? It should be sufficient to require mitigation with the assistance of a paleontologist in the event a significant resource is located.

e A-3-5, 2, 4: What is the basis for a one-mile protective buffer around an active golden eagle nest? Golden eagles have been proven to nest much closer than that to major human activity without disturbance to the nesting activities. Also, there may be physical barriers, such as topography, which may affect this buffer zone. The Price River Manage-

33-139 (cont.) ment Plan uses a ½ mile buffer. Again, Mono feels that mitigation in cooperation with the U.S. Fish and Wildlife Service must be allowed rather than arbitrary stipulation.

Appendix A-4
Uncommitted Mitigation Measures

33-140 It should be stressed in the FEIS that the measures discussed in Appendix 4 are a list of potential mitigation measures with potential for use but that specific measures would be decided on an applicant-specific basis .

Specific comments upon the mitigation measures follow:

33-141 A-4-1, 1, 2: It is unnecessary to clean sediment ponds several times a year. Ponds are designed to contain a specific volume of sediment and the design storms. Usually a pond is cleaned when a given percentage of the design sediment volume is found in the pond.

33-142 A-4-2, 1, 2: Some of the mitigation methods proposed may have value in minimizing impacts to wildlife. However, mitigation should be determined as part of the permitting process on a project specific basis. All projects may not be able to or need to increase carrying capacity. Will increased taxes and hunting license fees fund additional Wildlife Conservation Officers? Further, is it legal or even ethical to fire an employee for a game violation as proposed in the Sunnyside DEIS?

Appendix A-5
Water Resources

33-143 Mono Power questions the inclusion of this appendix since it is incomplete in that it does not include many applicable regulations.

Appendix A-6
Socioeconomics

No specific comments.

Appendix A-7
Reclamation and Erosion Control Programs

The following comments are made in regard to Appendix A-7:

33-144 A-7-2, 1, 4: The "Erosion Control, Revegetation, and Restoration Guidelines for use on Federal Lands" should not be stipulated in the FEIS. They should be developed jointly during the leasing/permitting process. These guidelines are not regulatory requirements and should be treated only as guidelines in the FEIS.

33-145 A-7-5, 2, 4: Seeding rates should not be doubled to compensate for adverse growing seasons. Appropriate seeding rates can be determined to compensate for poor success. An arbitrary 100% increase may be unnecessary or even cause problems, such as increased competition.

33-146 A-7-14, 2, 5: The requirements for benches and/or diversionary structures are unclear. It should not be necessary to bench unregraded topsoil and overburden storage piles. Erosion control systems will be in place downstream to contain runoff.

The requirement of benches at intervals not exceeding 100 feet is unreasonable. Spacing of benches varies with slope. No benches are needed in level terrain.

Appendix A-8
Endangered Species Act Compliance

No specific comments.

Appendix A-9
Visual Resource Management Methodology

If mitigation of impacts is not allowed, extreme visual resource protection as described in the Sunnyside DEIS may prohibit development by Mono Power. Mono Power believes that the visual resource analyses performed for exclusion purposes were inaccurate and overly restrictive. Many areas in question either are not readily accessible to the public or the impact can be mitigated through reclamation. Visual impacts resulting from fly-overs were apparently used as exclusion criteria.

33-147 Visual resource evaluations are a subjective undertaking. BLM has developed a widely applied methodology (BLM, 1978, 1980 d). Other entirely independent visual resource rating systems are used by US Forest Service and the National Park Service. (see e.g., Forest Service Handbooks 434, 483, 559) Regional rating systems also exist (USFS, June 1976). Current visual resource assessment is based on the long-standing discipline of landscape architecture.

Although the BLM methodology for rating visual quality is based on defined guidelines, the assignment of specific values to the parameters used in making the assessments is necessarily subjective and specific to the individual performing the analysis.

The comments which follow therefore are of two types:

- o Disagreement with numerical values used as a basis for calculation, or with the methodology used to produce a conclusion in the Sunnyside DEIS
- o Evidence of bias in the subjective judgements used in the analysis

A visual resource analysis for an area as large as the Sunnyside STSA for the variety of possible development options and siting locations is a complicated procedure. Components of the analysis derive from previous steps, and cannot be critically evaluated in the absence of that detailed backup data. A technical support document related to the proposed projects is not utilized for the Sunnyside DEIS.

Specific comments follow:

33-148 A9-1, General: Application of the BLM VRM system is made to both BLM and private lands, both within the STSA and outside it. This leads to several inconsistencies in the analysis:

- No accounting is made for the visual impact of the Chevron-GNC interrelated mine; e.g., it is inconsistent to preclude development of Mono property based on visual resource criteria when property immediately adjacent (which will probably be developed regardless) is exempted from the analysis.
- No assessment of visual constraints for activities outside the STSA are presented (e.g., no mapped constraint on Mono extraction plant, its lengthy access road, its spent sand disposal area) but these very elements (sand disposal) are cited as fatal flaws to landform and contrast (see pA9-5). This is inconsistent.

33-149 A9-1, 1, 3: The third paragraph gives the impression that the BLM VRM system was applied to the STSA for specific evaluation of the proposed projects. In actuality, the VRM assessment supporting the EIS was taken from a general 1977 study of coal and range regions (Ref. Legend, Map 3-5). In so doing, the VRM classes used in the STSA fail to account for tar sands development which will occur in the absence of lease conversion. A site specific VRM was not conducted for the Sunnyside DEIS.

33-150 A9-3, 1, 1: The reader would be well served by inclusion of specific assumption references on travel frequency and geographical usage, user volume and reaction, assumptions on major viewing routes and key observation points. Because visual resources are major constraining criteria, it is suggested that these assumptions be formally documented in a technical support document similar to those prepared for air quality and socioeconomics.

In the absence of such documentation, it may be assumed that distance zones and user volume, given the presence of ongoing interrelated projects, may not be appropriately applied.

33-151 A9-4, 1, 3: Credible contrast evaluation hinges on appropriate selection of "most critical" viewpoints. Since the STSA cannot be viewed from any one point in its entirety, and some proposed actions are not visible from a given viewpoint, defining these points becomes all the more important.

The viewpoints must be matched to user frequency data to be credible. This data can be presented in a separate technical support document.

33-152 A9-4, 2, 3: Paragraph 1 of the heading "VRM System Application to the Sunnyside Project" professes a desire to thoroughly document how the results of the impact analysis for the Sunnyside project were obtained. No specifics are mentioned in any of the text which follows. For example "The duration of view, numbers of viewers, angle of observation, relationships to other views, mining locations and techniques, ease of revegetation, and proposed restoration methods were considered..." How were they considered? Is a support document available?

33-153 A9-4, 2, 4: In the Sunnyside DEIS, "all [visual resource] impacts were considered to be long term (beyond the life of the projects) because of the long period of commercial questions and the length of time necessary to lessen the visual contrast with the existing landscape". Such an approach entirely neglects consideration of revegetation, phased progression of mining areas (especially in unitized scenario) and spent sand disposal. It is unreasonable to assume that no significant change in the visual impact would occur; indeed, to avoid such long term impacts is the stated purpose (pA4-4) of several of the recommended mitigation measures.

33-154 A9-4, 2, 5: The western escarpment and mountains of the STSA are said to be "highly visible" to travelers on Highways 6, 10, and 123 and residents of Price Wellington and other valley communities. The argument is advanced that proposed development would damage the contrast of the "background" and local views would therefore be "highly degraded".

This argument fails on several counts:

1) The western escarpment of the STSA is over 40 km (25 miles) from Wellington, Price, and Highway 10; and 15 miles from Highways 6 and 123. Modification of landform and contrast - if visible - would be subdued by distance. The background would likely not be significantly altered on this criteria.

2) The front face of the western escarpment is classified class IV under VRM criteria (see Map 3-5) - a liberal classification inconsistent with the "dramatic background mentioned on A9-5.

3) With the exception of spent sand from Whitmore Canyon tract, all Mono Power facilities will likely be hidden from view from the Valley Communities by intervening ridges.

4) The one Mono project area significantly visible from the west (Whitmore Canyon tract spent shale and extraction facility) is not indicated as having any visual resource constraints to development. This lack of noted impact is inconsistent with constraints indicated on adjacent similar lands for less visible from the west and south.

5) The statement that "local views [from Price or Wellington] would be highly degraded by alterations to the [STSA area] background" indicates a bias against Mono's commitments for diligent revegetation (Appendix A7). Assertions should be substantiated.

33-155 A9-5, 2, 2: Filling of existing canyons from the top does not present a "raised platform" any different from the flat ridge summit, which already are common to the area. The statement that "existing vegetation types would not be replaced in kind" or that natural vegetation would perhaps never invade the disturbed areas is an unsubstantiated generalization. Investigation of any project component reveals that most can be made compatible with VRM planning objectives, as is (inconsistently) stated in the last paragraph of the test.

Maps

Comments specific to maps presented in the Sunnyside DEIS are as follows:

33-156 Map 3-1: The Grassy Trail Creek watershed boundary is incorrect. The boundaries of the watershed upstream from the Grassy Trail Reservoir should be broken out separately since impact analysis is performed on that basis.

33-157 Map 3-1: Why is the Left Fork of Whitmore Canyon considered critical and the Right Fork not considered critical?

33-158 Map 1-5: This is unclear as to how the exclusion criteria were applied. How was it decided which criteria would constrain a given parcel of land? For example, some of the parcels upstream from the protected watersheds and Grassy Trail Reservoir are restricted for avoidances of both visual and watershed resources. Others, however, are restricted either for visual or for watershed avoidance. If the exclusionary criteria are to be utilized they must be consistently applied throughout Federally controlled lands. If certain parcels of land are constrained to protect watersheds then all parcels of land upstream of the watershed must be constrained.

RESPONSES TO COMMENT LETTER 33

To avoid duplicationn, none of the comments expressed in the cover letter and introduction to Comment Letter 33 are answered because these comments are repeated in the formal comment attachments.

33-1 Because the plans of operations for all five projects were received at the same time and because they involve adjacent lands within the STSA, BLM determined that the major portion of the analysis should address collective impacts. The comment is correct in that separate decisions will be made for each application and lease area. Appendix A-2 was prepared to summarize impacts from each applicant's plan of operations and to facilitate separate decisions.

The comment is also correct in that mitigation measures may vary from one lease to the next. The differing measures, when eventually adopted as lease stipulations, will be based on combined information from the collective impact analysis, the partial conversion alternative impact analysis, Appendix A-2, and the BLM land use plan leasing category determinations. See the Utah Combined Hydrocarbon Leasing Regional EIS (BLM 1984) for a discussion of leasing categories.

33-2 The problem is in the interpretation of the term disturbance and the impacts related to disturbance. The Sunnyside Draft EIS (page 1-23) states that disturbance would range from open pit mining with vegetation removal to travelways with crushed vegetation. The analyses based on these assumptions are not inconsistent in that the degree of soil movement and vegetation loss was determined according to the type of disturbance projected (i.e. crushed vegetation or topsoil removal). The EIS assumes near maximum disturbance of the mineable areas for surface mining as shown on page 1-23 of the draft. The estimate of disturbance for in-situ operations (Sunnyside Draft EIS, page 1-39) assumes that, of the 100 percent disturbance by the Sabins in-situ process, 40 percent would be directly disturbed and 60 percent indirectly disturbed by worker and off-road vehicle travel.

In the conversion of existing oil and gas leases to combined hydrocarbon leases, BLM had to assume that all of the acres applied for conversion by the applicant would be a needed part of the plans of operations for diligent development and thus would be under consideration for conversion. BLM has no basis under the law to consider acres for conversion that do not have the resource or were not requested under the provisions of the act as needed in support of tar sand recovery. Because the applications from Mono requested conversion of the entire lease area, the EIS presents a worst-case analysis.

33-3 The National Environmental Policy Act requires the formulation of reasonable alternatives to proposed actions. The partial conversion alternative is intended to analyze a series of constraints on development to help identify resource-by-resource alternatives that

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RESPONSES TO COMMENT LETTER 33 (Continued)

33-3 Cont. help define potential environmental protection for the Sunnyside STSA. Conversely, this alternative is intended to show how such constraints may hamper tar sand operations to give perspective to questions of what might be judged reasonable. All the factors portrayed are not intended to be selected in a single decision. Rather, these factors were arrayed in one alternative for ease of presentation. (See description of partial conversion in Section 1.D.) The eventual decision making goal is to strike a balance allowing tar sand development and reasonable environmental protection.

The concept of partial conversion (or lease stipulations for no surface occupancy, which would achieve equivalent protection results on part of a lease) is not ruled out by the Combined Hydrocarbon Leasing Act if BLM judges such partial conversion to be needed to attain reasonable environmental protection. Likewise, the concept of partial conversion may be considered if the plan of operations does not portray some expectation to attain diligent development for the entire lease area.

33-4 The description of the partial conversion alternative in Section 1.D has been expanded to more clearly explain the intent of the alternative, including the point made in the comment.

33-5 See analysis assumptions in Section 1.C.2, Applicants' Plans of Operations.

33-6 This comment does not accurately reflect the statement on the cover sheet, which expresses concern that significant impacts to vegetation could occur in spent sand disposal areas in low precipitation zones B and C in that more than 5 years might be needed to establish adequate ground cover. Evaluations in the EIS refer to the complete project area, which includes spent sand disposal areas of other applicants within climatic zones B and C.

Research and experience have shown that a greater risk of failing to establish understory vegetation (grassss and forbs) within 5 years would occur in climatic zones B and C than in zones D, E, and F, especially in spent sand disposal areas.

See the revegetation discussion under Section 3.A.3, Soils and Vegetation. We also recognize that understory vegetation could be reestablished within 3 to 5 years, assuming control, reclamation, and revegetation measures and techniques. The revegetation discussions in both EISs are consistent. Specific, potential risk areas are discussed in the Sunnyside EIS.

33-7 The cover sheet of the EIS presents a short, concise summary of the proposed projects and as such includes only the longest period of time proposed for mining (95 years). Therefore, the 100-year period for recovery is a minimum figure.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-8 The Utah Combined Hydrocarbon Leasing Regional EIS and Sunnyside EIS have been reviewed for consistency, and changes to either or both documents have been made as needed in the final EISs to achieve consistency. Specific comments on consistency are answered in response to Mono Power's comments that follow.

33-9 As stated in the EIS, the applicants have expressed interest in a cooperative unit agreement, but the unitized development alternative is based on BLM assumptions and not on a specific plan proposed by the applicants.

The comparison of alternatives is a useful and needed part of the EIS analysis. Though production rates may change for either the proposed action assumption or the unitized development assumption (50,000 bpd, based on discussions with industry personnel, including Mono Power) as to what might be a likely scenario for unitized development, or the (115,000 bpd provided by industry) proposed action, the comparison is still valid.

The comparative analysis does not use subjective terms as "advantage" but rather terms as "greater" or "less." BLM's preferred alternative, a statement of preliminary BLM management and policy input presented on the cover page to allow public comment and decision maker consideration, correctly uses the term "advantage" to present BLM's perception of the rationale for its preferred alternative.

33-10 The assumptions of a recovery in the coal industry and the elimination of relatively high levels of current unemployment are consistent with coal industry forecasts. Growth projections for the coal industry used in the Socioeconomic Technical Report (Argonne National Laboratory 1984) are less optimistic than those prepared by the coal companies.

The following procedure was followed to prepare the coal industry outlook: (1) meeting with coal company representatives to obtain their growth forecasts by project (mine) and (2) scaling down forecasts to account for double counting and the start-up of coal-fired power plants (both level of coal demand and timing).

A comparison of mine employment levels projected for 1985 with actual 1983 employment is inappropriate. The industry is still expected to recover from its prolonged depression but not in the same timeframe assumed in the report. The timing of the recovery may thus need to be extended, but the overall growth should still be accurate in the baseline conditions.

The probable impact of this delay on the communities would involve continued higher unemployment, greater outlays of unemployment and welfare benefits, a loss cf revenue, and the possible outmigration of workers seeking other employment. Adding alternative estimates

33-10 Cont. for the interrelated projects to the three alternatives for the tar sand development could cause confusion and make the report less useful. If this project is developed, further analysis will be conducted. Such analysis will include actual conditions of the coal industry at that time.

33-11 The Summary has been revised to more clearly reflect the vegetation impact discussion.

33-12 The estimate of 933 acres of cropland being converted to urban uses is based on the assumption that population would grow mainly near the existing population centers of Wellington and Price and to a lesser extent in communities along the Price River. These areas are either within or near irrigated cropland. (See cropland discussion in Section 3.A.9, Agriculture, and response to comment 38-61 for more references.)

33-13 This portion of the Summary has been changed accordingly.

33-14 Council on Environmental Quality regulations require including appropriate mitigation measures. The mitigation measures were developed by BLM management and were based on present law, policy, and knowledge. Mitigation is not a one-step process but will continue beyond the environmental assessment to stipulation development and into project development and monitoring. The cooperative mitigation agreement between the applicant and BLM is expected to continue throughout tar sand development. Mitigation measures have been rewritten to provide consistency with the Utah Combined Hydrocarbon Leasing Regional EIS (BLM 1984).

33-15 This portion of the Summary has been changed to correct this statement.

33-16 We believe that the colors are different enough to separate the two companies' holdings. The maps in the map pocket of the draft EIS present the holdings in different colors and may help in discerning these holdings.

33-17 The text and list of coal mines in Section 1.A.5, Interrelationships, has been changed to better show which mines are interrelated projects. Data on the mines were obtained from the State of Utah, Office of Planning and Budget.

33-18 Page 1-9, column 2, paragraph 3 of the draft EIS is in the general overview of the proposed actions and alternatives section. See Section 1.D, Partial Conversion Alternative and/or Special Mitigation, for a discussion of this concern. Section 1.D has also been revised to address your concern.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-19 a) Partial conversion is an alternative in the EIS (see Section 1.D).

b) The economic factors and potential project changes, though of concern to the applicants, are not within the scope of EIS analysis. The sentence has been revised to clarify the intent.

The decision maker uses all sources of information, including economic factors that affect the applicant. The EIS is just one source for making the final decision.

c) Company committed mitigation measures have been considered and used by the authors when analyzing potential impacts of the project. The authors cannot make conclusions based on mitigation for which no committment has been made. To do so might mislead the reader into believing that the uncommitted mitigation will be applied and the project impacts will occur, when in fact no commitment has been made. Identified uncommitted mitigation measures, however, are presented in Appendix A-4. These measures could be implemented voluntarily by the applicant or required by the authorized official. Also see the introduction to Chapter 3 for further clarification.

33-20 Footnote b in Table 1-3 has been changed.

33-21 The methods described are general, intended to give the reader a general idea of what could happen. Several methods have been proposed by the companies, including open pit, contour, and a combination of both. The text has thus not been revised.

33-22 Blast casting is a typical method that could be used and that has been proposed by Enercor. We recognize that not all companies would use the methods described in the General Plan sections. Appendix A-2 presents a summary of applicant plans of operations.

33-23, 33-24 Items presented in Section 1.C.1, General Plan of Operations, may or may not be used, depending on site-specific data. The general methods described in Chapter 1 are not requirements, nor are they meant to apply to all situations or companies. The independent proposals and impacts of these proposals are summarized in Appendix A-2.

33-25 This paragraph refers to a general plan, not to any one company plan. BLM assumed that run-of-mine ore would be delivered to the extraction plant.

33-26 The word "concurrently" has been changed to "countercurrently." See Section 1.C.1, General Plans of Operation, Solvent Extraction.

33-27 The difference is in the terrain, not in the techniques. The figures were used to give the public an idea of what a typical operation might look like.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-28 Figure 1-8 has been corrected.

33-29 A qualifying statement has been added to the start of each chapter to reflect your concerns.

33-30 The paragraph in Section 1.C.2. Applicants' Plans of Operations, has been reworded.

33-31 As discussed in Section 1.C.1, the purpose of this figure is to show the reclamation sequence, not techniques.

33-32 The text in Section 1.C.2. Applicants' Plans of Operations, has been revised to clarify the procedures. Settling ponds do not control erosion, but they do mitigate the downstream effects. See Appendix A-7 for details.

33-33 The partial conversion alternative would incorporate measures to prevent or reduce environmental, land-oriented impacts. Because little tar sand distribution data exists, no assumptions can be made on tar sand distribution. No attempt was made to study the economic feasibility of partial conversion on the remaining land because economic feasibility cannot be determined for any of the alternatives. Also see response to comment 33-3.

33-34 The paragraph states that no areas in the STSA met the exclusion criteria; therefore, no acres were excluded under the criteria.

33-35 That no officially designated critical habitats were identified in the Sunnyside STSA does not mean that no federally listed species occur on or near the STSA. Listed species can occupy an area even though no critical habitat has been designated.

33-36 The golden eagle nest shown in Figure 2-8 of the Regional EIS is outside the directly disturbed area analyzed in the Sunnyside EIS and was not discussed.

33-37 The raptor nest data was obtained from the Price River Unit Resource Analysis, Step 2, wildlife distribution maps. The nests were located not from a field study but from field recordation during other field work. The STSA proper has not been officially surveyed for raptor nests.

33-38 The reference to the coal unsuitability criteria has been deleted from Section 1.D, Partial Conversion and/or Special Mitigation. Also see response to comments 33-18 and 33-19.

33-39 The Federal Land Policy and Management Act has granted the authority to exclude "critical areas" as determined from resource evaluation, to protect resources (in this case livestock grazing). Where impacts can be mitigated, project activities would be allowed if approved by the authorized officer.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-40 Critical areas shown on Map 3-2 (map pocket of draft EIS) are critical to livestock grazing as either water sources or as grazing access to adjoining areas. The smaller delineations show areas involving water sources, such as springs and streams, which are considered critical and permanent. The larger delineations show grazing access in relation to water sources and adjoining grazing areas. The grazing access areas are not considered permanent, and impacts to them can be mitigated. Also see response to comment 33-39.

33-41 The Federal Land Policy and Management Act, Section 102 (a)(8), states that "...public lands be managed in a manner that will protect the quality of the scenic values..." BLM Manual Series 8400 defines methodology and assigns responsibility for managing visual resources.

See response to comment 32-2 for an explanation of how the "critical area" shown on Map 3-5 was determined.

33-42 Nickens and Associates of Montrose, Colorado conducted a Class II cultural survey during the 1983 field season. The results of the survey are expected to be published after the publication of this final EIS. At that time, we will know if significant cultural resources were found.

Depending on the significance of a cultural site, lands could be excluded from development. But such exclusion is not likely because most impacts to cultural sites can be mitigated through avoidance or data recovery. Findings from a Class II survey would determine if impacts to a cultural resource site could be mitigated.

Section 3.A.10, Cultural Resources, provides the results of a literature search (or Class I survey) of known cultural resource data. The findings in the May 1984 Class II survey report and a future Class III survey will provide needed data for mitigating impacts to cultural resources for these phases of the projects and for future proposals.

33-43 The partial conversion alternative was set up to be analyzed only on environmental exclusion criteria to give the decision maker "mix and match" options for tar sand development. Other factors such as socioeconomics will also be considered in the final decision.

33-44 No areas under unitized development were eliminated because of overriding environmental concerns. Therefore, worst-case analysis assumptions were applied. (See Section 1.C.2, Applicants' Plans of Operations, Analysis Assumptions, for a complete discussion of BLM's approach). Also see response to comment 33-2.

33-45 Proposed oil production from the STSA and its contribution to the United States oil supplies are described in Section 1.A.2, Purpose and Need for Proposed Actions. For example, local economic benefits from development are discussed under quality of life in Section

RESPONSES TO COMMENT LETTER 33 (Continued)

33-45 Cont. 3.A.2, Socioeconomics. The forgoing of these benefits would not result from the no action alternative because the local economy does not depend on them. Employment trends projected under the baseline would, in themselves, require additions to the local labor force. Failure to develop applicant projects would not cause a loss of existing jobs. Therefore, no losses to the area's present or projected economic baseline would occur. The no action alternative in Section 3.D has been changed to reflect this comment.

33-46 See response to comment 33-2.

33-47 The final EIS has not changed estimated acreages. The companies have stated several times that because no exploration on BLM land has been allowed, the total resources are hard to estimate. Therefore, the possibility exists that all of the leased land could be disturbed in one way or another. The final EIS has not changed figures for acreages that would be disturbed. Also see response to comment 33-2.

33-48 Unitized development might disturb less area than the proposed action, but only about 160 acres would be saved and the exact location cannot be predicted. This area amounts to less than half of 1 percent of the total 38,845 acres that would be disturbed. The analysis thus assumed that the same number of acres could be disturbed in each case over a longer period of time.

33-49 See response to comment 33-2.

33-50 Research and experience have shown that erosion control and reclamation are best accomplished when smaller areas are disturbed at any one time and reclamation follows land disturbance as closely as possible. Smaller disturbed areas reduce the size of exposed areas subject to erosion, reduce runoff potential, and allow for the greater effectiveness of erosion control and reclamation measures.

The environmental advantage of unitized development, as related to soils and vegetation, is compatible with your comment and is stated in Section 2.B, Unitized Development Alternative.

33-51 The Standards of Water Quality for the State of Utah were used to determine the significance of predicted impacts to water resources. These standards are described in Appendix A-5, Water Resources, and referenced in Section 3.A.1, Water Resources. The reference to professional experience has been deleted from Section 3.A.1.

33-52 The criterion states "if the water resources would be altered to such an extent that they could no longer serve the existing function." The analysis presents the duration of the impacts, and Section 4.C, Unavoidable Adverse Impacts, considers residual impacts after mitigating measures are applied.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-53 BLM could not calculate future chemical and physical changes in the watersheds because of the conceptual nature of the plans of operations. Therefore, BLM did not use the information from Mono's consultant. If the new factors cannot be determined, comparisons cannot be made.

33-54 The tables in Chapter 3 are based on the development assumptions stated in Chapter 1 and analysis assumptions in Chapter 3. The tables include spent sand disposal and all other types of disturbance. Rock Canyon and Bear Canyon are both in the Grassy Trail watershed.

33-55 Table 3-1 hae been revised to show the correct acreages.

33-56 Tbe 2.9 and 49 tons per acre per year are average figures that give a range of erosion rates that should not be applied to any specific site. The 2.9 figure is the average of the four "current condition" figures shown in Table A-7-2. Tbe 49 figure is the average of the four "exposed soil" figures shown in Table A-7-2.

33-57 This paragrapb in Section 3.A.1, Water Resources, has been deleted. Aleo see response to comment 33-56.

33-58 This paragraph in Section 3.A.1, Water Resources, has been deleted. Erosion is addressed in Appendix A-7.

33-59 Tbe U.S. Geological Survey (Lindskov and others 1983) reported that total disolved solids in Grassy Trail Creek ranged from 250 to 451 milligrams per liter upstream from the Sunnyside mine and from 1,250 to 2,000 milligrams per liter downstream from the mine. Therefore, no conflict exists. The EISs address different portions of the same stream.

33-60 The basis for assuming spent sand disposal areas and other facilities different from those proposed by the applicants was the need to fully analyze the impacts of converting all leases. If only the companies' proposals were analyzed, only those parts of the leases could be converted. See Chapter 1 for development assumptions. Also see responses to comment 33-2.

33-61 BLM agrees with the comment, and Section 3.A.1, Water Resources, has been revised to state that a decrease in deep water flows would probably not occur.

33-62 BLM agrees with the comment and has revised Section 3.A.1, Water Resources, to state that shallow ground water in the area would be affected by the loss of 23 springs due to the removal of the strata that now feed them. The water in these springs would not be lost from the area but would take the form of surface flow. Such increases in surface flow could increase peak flows in Grassy Trail Creek, but not noticeably.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-63 The reference to deep aquifer flow has been deleted. The reason that the Regional and Sunnyside EISs differ on water quality while using the same authority as a reference is that tbe two EISs analyze water guality at different points in the streams. The Regional EIS analyzes water guality at the boundary of the STSA, whereas the Sunnyside EIS analyzes water guality near the head of the watersbed and just downstream from the mine within the STSA.

33-64 The U.S. Geological Survey (Lindskov and others 1983) reports that yields from wells in the area are generally small and that water from many of the wells is saline.

33-65 The reference to floodplains being altered or eliminated in Section 3.A.1, Grassy Trail Creek Watershed, has been deleted.

33-66, 33-67 The analysis is based on potential impact. Observance of regulations and stipulations would reduce or eliminate the predicted impacts. See Section 4.C, Unavoidable Adverse Impacts, which shows no adverse residual impacts following mitigation.

33-68 This paragraph refers to the unresolved issues section of the Summary, which states that watershed impacts "would be subject to further discussion, coordination, action, and resolution outeide of and independent from the EIS process." Mineral extraction within the special watershed management areas could be allowed if all partiee agree.

33-69 The portion of Section 3.A.1, Water Resources, discussing Public Water Reserve 16 has been corrected.

33-70 Adjustments because of Chevron's changes in plans (including those both within and outside the STSA) are no longer needed because those changes are incorporated in the revised Socioeconomic Technical Report (Argonne National Laboratory 1984). Therefore, these adjustments bave been eliminated from the final EIS, and the technical report figures are used. Likewise, the changes in plans of the interrelated coal mines, mentioned in Section 3.A.2, are incorporated in the revised technical report. Estimates, however, have been made for the peak construction year of 1989 using the adjustment ratios because tbese estimates are not included in the technical report. The exclusion results from the need to maintain a consistent set of "window" years throughout the analysee of all of the Utah STSAs to obtain cumulative and comparative results. The Sunnyside site-specific analysis, however, must provide estimates of the peak construction impacts. Although these estimates represent less depth of analysis than those for the other years, we believe their omission would be a more serious deficiency.

33-71 The baseline projections were made before the recent economic recession in Utah, and the recession does affect the accuracy of the near-term projections. Baseline projections, however, were needed to prepare this report. The effects and duration of the recession could not be predicted, nor were they expected at the time the projections were prepared. The outcome of the recovery cannot be determined, and any estimate of the impact to Utah would be speculative. Moreover, the economy would need to be further into the business cycle before a revised future outlook for the coal industry--a large component of Utah's economy--could be accurately determined. Recomputing the baseline conditions and revising the entire report would thus be premature.

33-72 The baseline consists of economic activities that (1) now exist in the area of influence and (2) are not expected to significantly change from long-term trends. The area's existing and planned commercial business, infrastructure, and service capacities are designed for this baseline.

The interrelated projects are somewhat speculative and are thus not included in the baseline. This position is supported by the State of Utah. In comment 14.56 (page 32) on the Utah Combined Hydrocarbon Regional Leasing Draft EIS, the state reported that including the interrelated projects in the baseline would be a serious error. In comment 14.59 (page 32), the state reported that the potential impacts of developing tar sand projects and interrelated projects should be analyzed as a worst case.

The coal mines listed in Section 1.A.5, Interrelationships, include both baseline and interrelated projects because the baseline coal industry projections are made for the region as a whole and not by individual mines. The baseline projections are subtracted from the sum of the individual mines' employment projections. Therefore, the socioeconomic analysis of the interrelated projects includes only the employment that is in addition to the baseline.

33-73 To maintain a consistent measure of significance, we applied a percentage increase that often represents a significant impact, according to a study by the Department of Housing and Urban Development (1976). The significance criterion for infrastructure was allowed to differ from that for population and other demographic impacts for two reasons: (1) excess capacity exists in parts of the infrastructure in the area of influence and (2) personnel and equipment needs in small communities often form a high percentage of the area's total but involve small numbers. Both of these factors would cause the 5 percent significance criterion, established under Utah Code Annotated Section 63-51-10 (Supp. 1981) to overstate the severity of infrastructure impacts. In the text, impacts are related to capacity figures obtained. Quantified impact estimates allow local planners to determine the actual impact significance for their areas.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-74 Mining is the leading industry--both current and projected--in the area of influence, resulting in a relatively high baseline per capita personal income (PCPI). As shown on page 2-42 of the Socioeconomic Technical Report, PCPI in the two counties in 2005 is projected to reach $12,585. The proposed actions (largest of the tar sand impacts) would raise total personal income in the two counties from $653 million to $995 million and total population from 51,800 to 75,500, resulting in a PCPI of $13,171 or a 4.7 percent increase over the baseline. As stated in Section 3.A.2, Socioeconomics, Population and Employment, the cumulative impact of the proposed actions and the interrelated projects would be significant, resulting in a PCPI of $13,311, 5.8 percent above the baseline.

The Socioeconomic Technical Report accurately describes the PCPI projections by year and total personal income by county (Table 4.18). When the PCPI projections for each tar sand scenario are compared to the baseline projection, the difference ranges from 63 percent in 1985 to 15 percent in 2005. The large differences in the earlier window years can be attributed to the sizable growth in mine employment forecast to occur in Carbon and Emery counties.

Miners are typically paid more than other positions, and mining salaries inflate the PCPI projections for each scenario. In addition, construction and mine workers typically have smaller households than the overall population. This fact significantly influences the large increase in the PCPI projections, which are computed by dividing personal income by the population base.

33-75 The personal income increase figure of $1,289 million shown in Section 3.A.2, Socioeconomics, Personal Income, is erroneous, as are similar figures for the other alternatives. These figures represent total cumulative personal income rather than the increase. The text has been changed to correct these errors. The conclusions of these paragraphs, however, have not changed because even unitized development would result in a 67 percent cumulative increase in the area's personal income. Tables 4.20, 4.21, and all other infrastructure service demands tables were inadvertently omitted from the draft Socioeconomic Technical Report during printing. These tables are included in the final technical report (Argonne National Laboratory 1984).

33-76 The statement that "a majority of the additional capacity would be needed to meet the demands of the construction period..." means that most but not all of the capacity would be needed at that time. The significance of the statement is that, because the construction period precedes operation, most of the facilities will have to be built by that earlier date. Thus, local governments have less time to prepare for the impacts than they would if only operation were involved.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-76 Cont. The Utah Code allows but does not mandate mitigation. Actual mitigation requirements are subject to negotiation between the applicant and local government. For this reason, such mitigation measures are described in this EIS under the heading of Uncommitted Mitigation. In the absence of specific and mandated requirements, mitigation of the impacts cannot be assumed.

The word "newcomer" should be "revenue."

33-77 Any economy based on one or two industrial sectors runs the risk of instability. Although applicant and interrelated projects are planned for long-term operation, they all depend on non-renewable resources and must eventually end. More importantly, energy market cycles could cause an earlier, temporary or permanent shutdown of those operations. Therefore, the consequences of a decline must be recognized in the analysis of any development of this size. The text has been changed to eliminate the word "peak," which caused the misconception that the construction phase would cause a greater impact than the long-term operation.

33-78 To expand school facilities requires at least 1 year of planning and construction. Adding professional personnel requires at least several months. If shortages are to be avoided and quality of education maintained, adequate facilities and personnel need to be in place when the new students arrive. State equalization funds, however, are not disbursed until the students have already arrived. To operate in the lead time, school districts need to obtain funds before they receive state equalization monies.

33-79 The total disturbed acreage shown in Table 3-9 is based on the EIS assumption figures from Table 1-9. See footnote (a) in Table 1-9. The differences between the applicants' proposed plans of operations and the EIS assumptions are explained in Section 1.C.2, Applicant's Plans of Operations. Also see response to comment 33-1.

33-80 Reducing elevation would generally reduce slope steepness and create a more rolling and hilly terrain in the reconstructed landscape with less intricate aspect and micro relief expression. Such changes would strongly affect the associated microclimate (temperature and moisture relationships) that strongly influence vegetation type and diversity. The EIS discussion of topography, climate, and their influence on vegetation types is consistent.

33-81 Section 3.A.3, Soils and Vegetation, has been revised to show 35 percent.

See Appendix A-7, Erosion Control Revegetation and Restoration Guidelines for use on Federal Lands, Maintenance and Monitoring section. The applicant and authorizing agency would jointly inspect the reclaimed areas to determine measures for any site-specific needs.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-82 This reference provided valuable information on the mantle thickness of favorable plant growth materials needed to ensure a growth medium that would adequately provide water and nutrients for the establishment and growth of adapted native plants.

Whether the mantle is overlying compacted spent shale or compacted spent sand is immaterial when the underlying material is not considered as part of the plant growth medium. Spent oil shale and spent tar sand disposal reclamation will require basically the same techniques and measures.

33-83 Worst-case impacts to vegetation are projected because (1) the proposed project operations are conceptual, (2) the project is large, and (3) the terrain is steep and irregular.

Appendix 7 provides measures and procedures for erosion control, reclamation, and revegetation of land disturbance. The significance of impacts and areas affected, however, would depend on how well the proposed reclamation measures are implemented.

33-84 See the revegetation discussion in Section 3.A.3, Soils and Vegetation. We also recognize that understory vegetation could be reestablished within 3 to 5 years, assuming control, reclamation, and revegetation measures. The revegetation discussions in both EISs are consistent. Specific, potential risk areas are discussed and identified in this EIS.

Reliable research and experience have shown that a greater risk of failing to establish understory vegetation (grasses and forbs) within 5 years would occur in climatic zones B and C, especially spent sand disposal areas. This condition is referred to in Section 3.A.3, Soils and Vegetation.

33-85 The assumptions and significance criteria as related to vegetation type diversity were developed to evaluate impacts on a comparative basis with current land use and existing conditions. The current vegetation diversity is the key to the aesthetic and wildlife values of the area. Reductions in the intricate vegetation diversity would strongly affect wildlife habitat and the related aesthetic values to the point of changing the uses of the landscapes.

See response to comment 33-80 for information on the influence of landscape and elevation on vegetation.

33-86 The 10 percent figure is based upon acres of crucial habitat in Utah Division of Wildlife Resources (UDWR) deer herd unit 27B. The 10 percent cutoff is based on professional experience and conversations with BLM and UDWR biologists.

33-87 See analysis assumptions in Section 1.C.2, for an explanation. Also see response to comment 33-1.

33-88 See Section 3.A.3, Soils and Vegetation, for a discussion of the time needed to reestablish vegetation types to preconstruction wildlife habitat productivity. The Sunnyside and Regional EISs differ on the length of time required for reclamation to be completed because the Regional EIS calculated the time needed to establish understory vegetation (3-5 years, which is consistent with the Sunnyside EIS), whereas the Sunnyside EIS calculated the time needed to establish understory and overstory vegetation. Establishing overstory vegetation would take 20 year or more. Also see response to comment 27-12.

33-89 Because a worst-case analysis is presented in this EIS, the cumulative disturbance total from Table 1-10 is 38,845 acres, not 25,454 acres as presented in the applicants' plans of operations. Also see response to comment 33-2.

33-90 You are correct. The percentages in Table 3-13 have been changed.

33-91 The "area of influence" is deer herd unit 27B, which has 266,944 acres. The STSA, used as the basis of comparison in the Regional EIS (BLM 1984), is only part of the herd unit. The 88,926 acres of high-priority deer summer range was calculated from BLM deer herd habitat maps from the Price River Management Framework Plan (BLM 1983g). The same statement is true for elk habitat.

33-92 The available carrying capacity of the range at the time of development cannot be accurately projected. Mule deer could increase to carrying capacity during the analysis. Therefore, a worst-case analysis would find that displacement could cause competition, stress, and loss of animals.

33-93 The paragraph does not state that the nearby areas are at carrying capacity. It states "If the nearby areas were at carrying capacity..."

33-94 The Utah Combined Hydrocarbon Leasing Regional Draft EIS (BLM 1983a) analyzed impacts over a 20-year period. The Sunnyside EIS analyzes impacts on more detailed, site-specific plans of operations that cover 74 years. Thus, the number of acres disturbed was increased.

33-95 The big game discussion of Section 3.A.4, Wildlife, gives the calculations for determining the 23 percent potential displacement. If habitat disturbance occurs on about 6,500 acres per year, 10 percent of the 62,956 acres of summer elk range in the STSA would be affected.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-96 The elk population estimate of 100 animals is for the Range Creek elk unit, not just the STSA, and was furnished by the Utah Division of Wildlife Resources in Price, Utah. BLM thus assumes this is the present population of the total elk unit. The estimated elk population in the main block of the STSA is 40 to 60 animals as stated in the Regional EIS (BLM 1984). The reference to 800 elk has been removed from the big game discussion of Section 3.A.4, Wildlife.

The 199,296 acres are winter range estimates. Summer ranges are the limiting factor in this area, and the disturbance of 22,554 out of 80,640 acres (Table 3-12) would be significant.

33-97 The acreage figure in the bird discussion of Section 3.A.4, Wildlife, is incorrect and has been changed. The new figure of 2,826 acres of agricultural land includes irrigated cropland and pasture (both dry and irrigated). The 933 acres consists of irrigated cropland only. These acreages are based upon conversion of agricultural lands reported in the U.S. Department of Agriculture, Economic Research Service (1970) study. Game bird habitat would be reduced by 17 percent.

33-98 The Regional EIS calculated surface disturbance using a 20-year project life. The Sunnyside EIS calculated its surface disturbance using more complete site-specific applicant plans of operations and a 55-year project life in the STSA.

33-99 Because of its broad regional scope, the Utah Combined Hydrocarbon Regional EIS was not required to fully comply with the provisions of the Endangered Species Act of 1973. Being site specific, the Sunnyside EIS had to comply with all provisions of the law. Correspondence with the Fish and Wildlife Service concerning the Sunnyside area (Appendix A-8) revealed that some listed species could occur in the project area, and impact analysis found that adverse impacts would occur if the species are found. Only when the biological assessment and biological opinion are completed for the Sunnyside area will the final impacts be known, and only when Section 7 procedures are re-initiated on later project proposals will final impacts to these listed species be known.

33-100 The correct figure is 23 animals harvested. Table 3-4 has been changed to 6 bears and 17 cougars.

33-101 A visual resource inventory/evaluation process consists of three steps: (1) assessing the scenic quality of a landscape, (2) determining the sensitivity of the people to change in the landscape; and (3) determining the viewing distance. The results of these steps are combined to form VRM classes. The 1977 data was reviewed before determining impacts from the project, and the information was still determined to be relevant. Use volume has risen slightly in Carbon and Emery counties since 1977, but user attitude has remained essentially the same. Viewing points have

33-101 Cont. remained the same, so distance zones have not been affected. Scenic quality, being a characteristic of the natural landscape, has remained the same except for occasional cultural changes. The net effect would be that the VRM classes, if anything, should become somewhat more restrictive, which was taken into account when visual resource critical areas were determined.

A technical report was not believed to be needed for visual resources because the data exists in the Price River Management Framework Plan (BLM 1983g).

33-102 It is difficult before the fact to determine how many acres of land would have their visual character affected by placing a certain facility on a landscape. Visually affected acres could only be those disturbed for construction or occupied by the new facility, or the whole area viewed from a particular viewpoint or series of viewpoints could be affected. To apply this concept to tar sand recovery, one might determine that many more acres than the ones physically disturbed would be significantly affected. But determining how many more acres would be affected may be virtually impossible. Recovery would disturb only portions of the lease where feasible recovery would occur and where ancillary facilities would be placed, but only analyzing these portions would not be reasonable either. So, the total area that could be affected by each applicant was determined to be a reasonable compromise for determining impacts.

33-103 Revegetation would occur as soon after mining as the companies have committed. Some would reclaim in stages concurrent with mining, and others would wait longer (up to 20 years). Therefore, for some operations only a part of the mining area would be disturbed or remain unreclaimed at any one time, and at the end of the operational period revegetation would be fairly well established. Other areas would be revegetated well beyond completion of mining and would require many years for the visual contrasts to be lessened. As a result, the impacts would be long term for all operations, even from vegetation disturbance, and especially when considering landform and structural contrasts.

33-104 The extensive landform changes that most companies are proposing in their surface mining would cause major movement of materials. Placement of overburden and spent sand would form new, geometric landforms that in most cases would not blend with the highly eroded, colored, natural landforms. Moreover, new, reshaped landforms created by mining would contrast with the existing landscape.

33-105 The statement further explains that the landforms of the background are essential in complementing the foreground and middleground views from valley observation points. Because local views are not nearly as dramatic as the background itself, added quality is placed upon these views. Degrading the background would thus degrade the foreground and middleground views. The landform would be "severely

33-105 Cont. altered" where surface mining occurs because of the huge amount of overburden to be removed and resource to be extracted. It would be almost economically impossible to replace the overburden to reconstruct the skyline to a near-natural condition as seen before extraction began. The impact would thus be "forever."

33-106 See response to Comment 33-2 to clarify the first paragraph.

When the 1,400-acre Chevron-GNC project is developed, the acreages that would be significantly affected should be reclassified to VRM Class V. Objectives for managing the area for visual resources, however, would remain the same as presently assigned. The objective of a Class V area is to rehabilitate the area so that it will meet the prior objective, which in this case would be Class II.

The influence of the 1,400 acres was addressed by recognizing that if the total acreage is mined, 1,400 acres of VRM Class II area would create a significant and adverse impact to the natural landscape. The impact was projected to be highly significant because most of the disturbed landscape would be visible from the valley area to the west and south of the site. The impact is listed in the table under the heading of VRM Class II, significantly affected. The cumulative impacts for visual resources, Class II include the influence of the 1,400 acres in both the text and table summaries.

33-107 The conclusion of the analysis is that some of the projects as proposed could not meet air quality standards and are probably not feasible. The intent of this study was not to determine the production level that meets the NAAQS or PSD increments but to determine impacts from facilities suggested by the lease applicants. Therefore, the worst-case impacts occur at the predicted concentration levels for the production level proposed by the applicants. Also see response to comment 38-48 (dealing with the analysis approach to air quality impacts).

33-108 Sources of the monitoring data are listed below Table 2.1-2 of the Air Quality Technical Report (Aerocomp Inc. 1983). In particular, the TSP exceedances occur in Price. This information was obtained from the Utah Bureau of Air Quality. Also see response to comment 30-6. Section 3.A.7, Air Quality, has been changed, and the change is included in errata to the Air Quality Technical Report.

33-109 Map 3-6 is a cumulative impacts map that includes project and non-project related impacts. Map 3-12 shows the non-project related impacts. As stated on page 3-116 of the draft EIS, about 75 percent of the impacts around the Price-Wellington area (Map 3-6) would result from the expected population growth in the absence of the projects. Population growth as a consequence of the projects accounts for the other 25 percent.

33-110 Many factors were considered before the regression formula was adopted. First, specialiste analyzed the relationship between emission density and ambient particulate concentrations. The correlation between theee two parameters wae r=0.89 for the annual and r=0.70 for the 24-hour TSP concentratione. This relationship essentially provided a calibrated model for fugitive particulate emissions. Second, the scope of the problem also encouraged the use of regression techniques. The whole eastern half of Utah had to be considered in the treatment of fugitive duet, and this is beyond the range of VALLEY Model. Another factor in favor of the regression approach was consideration of deposition. The dispersion models used do not treat deposition, whereas deposition is built into the regreseion equation.

Uncertainties in the facility types, location, and emissions discouraged the use of dispersion models to treat area sources. For instance, the location of the pollutant eource can dramatically affect air quality. Locating a facility on high terrain might result in no impacts, whereas the same facility on a valley floor might have adverse impacts. After considering all of these factors, it seemed appropriate to adopt the generalized approach of the regression formula.

33-111 The regional concentration pattern from the MESOPUFF output was used to assess acid deposition. Given the uncertainties in facility emissions, location, and site-specific meteorological data, straight-line trajectories are most appropriate to handle the visibility and photochemical smog analyses. This approach was also used in the Uintah Basin Synfuels Development EIS (BLM 1983f).

33-112 Neither the Sunnyside EIS nor the Air Quality Technical Report refers to the Uintah and Ouray Indian Reservation as a Class I area. Tables 3-18, 3-34, 3-45, and 3-49 list this Reservation as a Class II area, and in all other instances the Reservation is referred to as an "area of epecial concern."

33-113 The 5-acre figure refers to cropland directly within the project area. (The final EIS hae been revised to identify this.) The 5-acre figure was used as a significance criterion for this project and is based on the percentage and importance of cropland within the county and immediate area. Carbon County has a low cropland acreage base.

33-114 Section 3.A.9, Agriculture, states that 2,826 acres of land would be converted to homesites and other related urban development, of which 933 acres would be cropland. Section 3.A.4, Wildlife, has been revised to reflect these figures.

33-115 See response to comment 33-33.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-116 The eignificance criteria for visual resources outline two types of significant adverse impacts: highly significant and significant. Highly significant adverse impacts relate to the areas that could be viewed from the valley lands to the west and south of the conversion area and that were removed from consideration in the partial conversion alternative. Significant adverse impacts, however, are shown for the alternative for those areas where the proposed activities would not meet the objectives of the VRM classes in which they occur.

33-117 No known fugitive dust control measures would fully mitigate TSP impacts from the assumed production level (Aerocomp Inc. 1983). In other words, to meet the TSP significance criteria, the production level would have to be reduced. Aerocomp investigated the existing technology, and thus a BLM or Environmental Protection Agency reference is inappropriate and probably does not exist for a tar sand project of this size.

33-118 Comparing Tables 3-18 and 3-34, we note the following items:

- SO_2 air quality impacts are more severe from the partial conversion alternative;
- annual TSP impacts are more severe from the proposed actions but the reverse is true for the 24-hour impacts; and
- NO_2 air quality impacts are approximately equivalent from the proposed actions and from the partial conversion alternative.

A comparison of emission inventories for the two alternatives, however, reveals that particulate and SO_2 emissions are less for the partial conversion alternative and that NO_x emissions are equivalent.

Although maximum impacte may not improve with the partial conversion alternative, the areal extent of those impacts is reduced.

33-119 See Appendix A-9, Visual Resource Management Methodology, BLM Visual Resource Contrast Rating System. The system sets a threshold for each VRM class to determine at what point a proposed activity might exceed the objectives for that particular class.

33-120 See response to comment 33-103 for a response to the first paragraph.

Where a major landform change would occur as a result of removing many feet of overburden and then removing many more feet of tar sand, two types of landform blending would be possible. One minor form, which is generally the only practical method, would be to try to blend the resulting form along the edges with the existing natural landform. The second method would be to try to recreate the pre-existing landform and skyline. Because of the huge amounts of material that would need to be replaced, this effort would generally

33-120 Cont. be impractical. Therefore, from a distance, a contrast would be created with the existing landform. The plan referenced in Appendix A-3 addresses a design "to blend into the existing environment so as to most nearly meet the minimum degree of contrast acceptable."

33-121 See response to comment 33-103.

33-122 You are correct about this inconsistency. The maximum annual impact on Map 3-11 should be 149 ug/m^3. The isopleth map has been corrected in the final EIS.

33-123 A footnote has been added to the map to show that the air quality isopleths represent the sum of calculated impacts and the projected background values. See Section 3.D, No Action Alternative for impacts due to the expected population growth in the absence of the proposed tar sand projects.

33-124 Map 3-11 has been corrected in the final EIS.

33-125 All mitigation measures may be modified by the authorized officer.

33-126 Public Law 294 authorizes the Secretary of the Interior, in cooperation with the town of Sunnyside, "to prescribe and enforce such regulations as he may find necessary... for the purpose of storing, conserving, and protecting from pollution the said water supply." BLM, for the Secretary of the Interior, would consider alternative measures if their effectiveness could be assured.

33-127 Measure 3 is not intended to address surface occupancy or activity. It merely states that "all surface and in-situ mining will be preceded by hydrologic testing and evaluation." The obvious intent is to protect important aquifers in public water reserves and riparian areas. The measures have been rewritten to be consistent with the Regional EIS (BLM 1984).

33-128 Mitigation measures in Section 4.A, Site-Specific Mitigation, have been rewritten to be consistent with the Regional EIS.

33-129, 33-130 Section 4.A, Site-Specific Mitigation, has been reworded to state that the restrictive dates noted in the mitigating measures may be changed by the authorized officer in consultation with the Utah Division of Wildlife Resources. These measures, which would protect wildlife, were taken from BLM land use plans and must be applied regardless of the level of significance found in the impact analysis.

The restrictive dates noted in the mitigation may be changed by the authorized officer once an application is filed.

33-131 Mitigation measures 3 and 4 in Section 4.A, Site-Specific Mitigation, have been rewritten to include the following: "Exceptions to this limitation may be specifically authorized by the authorized officer of BLM."

RESPONSES TO COMMENT LETTER 33 (Continued)

33-132 This requirement is based on data in the Moab District Tar Sands Leasing Categories.

33-133 The restrictive dates noted in the Sunnyside EIS are based on current data in the Price River MFP (BLM 1983g) and Volume II of the Regional EIS (BLM 1984). As in all cases, the authorized officer may change restrictive dates to meet site-specific conditions.

33-134 Table 4-1 has been corrected.

33-135 Although no direct disturbance from tar sand development would occur within the WSAs, tar sand development would probably decrease the wilderness quality of several WSAs within the area of influence. An increase in visitors to wilderness units would likely degrade the areas' natural character and diminish opportunities for solitude. The quality of trout fishing and the naturalness of Range Creek would decline, thereby degrading the wilderness quality of portions of both Desolation Canyon and Turtle Canyon WSAs. Poaching and wanton killing of wildlife and vandalism to trees and cultural resources are likely to increase. In addition, mining and newcomers to the area are likely to create more jeep trails within accessible portions of the WSAs. The two documents are not inconsistent because both project a loss in wilderness quality.

33-136 Table 4-3 has been revised. The water quality lost during the time of the impact cannot be retrieved but it can be reversed. It would be lost for that period of time.

33-137 Table A-2-11 is based on Mono's Plan of Operations, which does not include the total area to be converted. Table A-2-12 is based on 9,863.13 acres, the total to be converted, as shown at the top of the table.

33-138, 33-139 The title of Appendix A-3 is "Existing Oil and Gas Provisions and Required General Measures Designed to Reduce Impacts."

All of the measures are commonly applied to projects on public lands as deemed necessary by the authorized officer. The authority for enforcing these measures has been established by law and regulation. If imposed as stipulations on the lease conversion, Mono would have the option of negotiating with BLM on final wording. These standard measures are included in the EIS as analysis assumptions and as a starting point for developing stipulations.

33-140 See the first paragraph of Chapter 4.

33-141 The times shown for cleaning sediment ponds are the times when the ponds are most apt to need cleaning. The actual frequency would be determined by inspecting the ponds. The intent is to maintain their function of trapping sediment.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-142 The mitigation measures noted in Appendix A-4 are offered as suggestions to the decision maker; none of them are required.

33-143 Appendix A-5 is not intended to include all applicable regulations--only those relating to special watershed areas.

33-144 The Erosion Control, Revegetation, and Restoration Guidelines are standard measures that would be used as a guide for applicants and BLM to develop a detailed, site-specific erosion control and reclamation plan. When approved by the authorized officer, this plan would become a part of the project construction, operation, and maintenance plan. These guidelines provide the basis for developing and evaluating erosion control and reclamation plans to ensure implementation and compliance with effective reclamation measures and techniques.

33-145 Increasing seeding rates up to 100 percent over regular seeding rates for critical areas and adverse climate areas is an effective and common recommendation made by the Soil Conservation Service and other agencies to compensate for the seed mortality that commonly occurs under these conditions.

33-146 Erosion control is most successful when measures that reduce runoff and protect the surface are effectively applied on the upper portions of a watershed or slope. The measures would reduce water runoff (volume and velocity), prevent later soil loss, and reduce sediment content in runoff water.

Benches provide a break in the sideslope interval, reducing slope length and allowing space for construction of diversionary structures such as a terraces or diversions to contain runoff and allow water to flow to a better outlet area.

Benches are highly effective and can be feasibly implanted in conjunction with overburden and topsoil storage placement, reconstructed landscape grading, and spent sand disposal pile construction.

Bench intervals would vary and would be determined during mining according to site-specific needs.

33-147 The visual resource criteria used to determine lands to be excluded from the partial conversion alternative have been discussed in previous comment responses. (See responses to comments 32-2, 33-103, and 33-116.)

Visual resource inventory and analysis efforts tend to be subjective, but all of the methodologies are based upon the principles of design and theories of visual perception, which add continuity to the art. When applied by professionally trained landscape architects and others aware of such principles and studies, such methodologies give a standardized rating of visual resources and potential impacts.

RESPONSES TO COMMENT LETTER 33 (Continued)

33-148 The projected significant visual impacts of the Chevron-GNC operations are included under Interrelated Impacts, Table 3-15 (1,400 acres would have highly significant impacts). Because the leases are privately held, they are not regulated under the same laws that regulate the lease conversions and are treated as part of the cumulative analysis.

Activities outside the STSA are analyzed if they are part of the lease conversion being requested. See Table 3-15 for a summary of impacts expected from the plants and spent sand disposal area. Impacts from ancillary facilities, such as access roads, are not analyzed because the applicants did not provide data on locations and designs. These facilities will be analyzed when applications to build them are reviewed.

33-149 Appendix A-9 describes the VRM system and the BLM contrast rating procedures, as well as how the VRM system was applied to the proposed projects.

A new site-specific VRM inventory was not conducted solely for the Sunnyside EIS because the 1977 data was determined still to be relevant. (See response to comment 33-101 for an explanation.) VRM classes, once determined, apply to any type of project, since the classes set objectives for management.

33-150, 33-151 When determining what technical reports would be essential for the EIS, BLM believed that few readers would gain value from a visual resource technical report. This belief has not changed since the draft EIS was published because only one commenter requested documentation. Certain data, such as travel frequency, geographic usage, user volume, recreation usage, and similar information is presented in other portions of this EIS.

Interrelated projects would cause little if any change on distance zones and user volumes, which were used for determining VRM classes in 1977.

33-152 The items of concern were all critical in determining that the lease operations, which would be viewed from the valley areas to the west and south, would create highly significant adverse visual impacts. The duration of view is important to valley residents because the everyday view of the area serves as a background and skyline silhouette to local views.

The mountainous areas surrounding the valley set the visual character for the region. Highway users experience the visual effect of the mountains as they drive within and through the region. A number of viewers live in the communities and travel the valley highways, as stated in the Transportation and Socioeconomic sections of this EIS. The angle of observation becomes extremely important as one moves through the valley and as the days and seasons change.

33-152 Cont. The lease area changes character as the angle of observation changes. These changes affect the local views. At times the background and silhouette create the character for the local views. At other times the local views prevail over the more distant background views. The ephemeral qualities and subtleties of the complex views and landscapes would be extensively changed with the extreme change in landform and, to a lesser extent, with the change in vegetation of the lease area caused by surface mining. The ease of revegetation and the proposed restoration methods were considered when determining the line, color, and textural contrasts of new vegetation alongside indigenous types. Many years would be required before the vegetation contrasts would be subdued to the point of meeting the visual objectives required for each affected VRM class. When synthesizing the above factors, the evaluator must subjectively mesh these considerations with the inventory/evaluation procedures described in Appendix A-9, Visual Resource Management Methodology.

The need for a support document is discussed in response to comment 33-150.

33-153 We acknowledge that proper and considerate rehabilitation methods, including recontouring and revegetation, would do much to alleviate many project impacts. The primary visual resource impacts, however, would result from landform rather than vegetation changes. (See response to comment 32-3.) The purpose of most of the visual resource uncommitted mitigation measures (Appendix A-4), as stated in many of the items, is to reduce the degree of contrast rather than to eliminate it, which may be impractical.

33-154 1. At distances such as 25 miles, the eye tends to recognize lines and shapes that define skyline and patterns. At this distance, the massive earth movements of surface mining would highly change the skyline, especially when viewed alongside the natural landscape of adjacent areas that would not be mined. When illuminated with backlighting (sunrise) and front lighting (late afternoon, evening) and highlighted through seasonal change (snow, spring or winter vegetation patterns), the landform would become highly visible and would generate visible contrast.

2. As described in the paragraph referenced in the comment, the front face of the western escarpment (VRM Class IV) is "not nearly as dramatic as the background itself, which places added quality on the (background) views."

3. As noted in the response to paragraph 1 above, the tract would in some instances be viewed from across Castle Valley to the south and west of the STSA, making many portions of Mono's tracts visually sensitive.

4. The Mono project spent sand disposal area would lie in a VRM Class IV area. The analysis concluded that with proper landform

33-154 Cont. blending and effective revegetation, VRM Class objectives could be met. Other lands that would be significantly affected would mainly be in VRM Class II areas where management objectives would not be met.

5. See responses to comments 32-2, 32-3, 33-41, 33-105, and 33-153. The major landform disturbances would not be adequately rehabilitated to meet the VRM class objectives, not because of Mono's unwillingness to attempt such rehabilitation but because of the economic and practical realities of reshaping large amounts of materials.

33-155 Landforms are expected to contrast at valley fills or on the flatter, more geometric disposal areas where placed on the outwash plains to the west of the Book Cliffs. Only when comparing the contrasts created by these fills with the objectives of the appropriate VRM class could one determine the degree of impact. This process was used in the visual resource analysis.

Practical knowledge of how fills are built would show the near impossibility of rebuilding the intricate material layers. Of importance would be similar slope, aspect, nutrient, and moisture regimes to host the vegetation diversity of the surrounding landscape. Therefore, contrasts in vegetation line, color, and texture would occur for many years until vegetation patterns nearly equal natural conditions.

Many of the project operation and facility designs would be reconfigured for economical and practical reasons as well as for natural constraints. Many areas with significant visual resource impacts, however, would remain.

33-156 The Grassy Trail Creek drainage boundary is approximately correct as shown on Map 3-1. The drainage into Grassy Trail Reservoir is shown in purple on Map 3-1 as a critical area (Left Fork). The Right Fork drainage is approximated by the watershed boundary between Grassy Trail Creek drainage and Nine-Mile Creek drainage, shown in green, and the eastern boundary of the Left Fork.

33-157 The Left Fork drains through a public water reserve. The Right Fork does not.

33-158 Constraining criteria were applied only if the resource under consideration was found on a given parcel of land. For example, if an area is not visible to tourists traveling along U.S. Highway 6, no visual constraining criteria were applied. Criteria that did not apply to the area were dropped. In certain watersheds, all constraining criteria need not be applied.

Jack G. Swenson
Executive Vice President
and General Manager

Rocky Mountain
Oil & Gas Association, Inc.

345 PETROLEUM BUILDING • DENVER, COLORADO 80202
303/534-8261

January 27, 1984

Mr. Gene Nodine
District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

The Rocky Mountain Oil and Gas Association is a trade association whose members account for more than 90% of the exploration and production of oil and gas in the states of Montana, North Dakota, South Dakota, Colorado, Wyoming, Idaho, Nebraska and Utah. Many of its members are active in the development of the tar sands resources in the State of Utah and the Sunnyside Special Tar Sands Area, in particular. The draft Environmental Impact Statement on Sunnyside Combined Hydrocarbon Lease Conversion and subsequent decisions by the BLM on lease conversions in the Sunnyside STSA will have a significant impact not only on the development programs of member companies but on the development of a commercial tar sands industry in the United States. Individual member companies will provide comments on the effects of the draft EIS on their development programs. RMOGA will address its comments principally to those portions of the draft EIS which will affect the development of a viable, competitive domestic tar sands industry which is important to the long term energy security of the United States.

34-1 It should first be emphasized that RMOGA's position is that combined hydrocarbon lease conversions are specified by statute to require a plan of operations that provides only for (1) diligent development, and (2) reasonable protection of the environment. The conversion of the lease itself does not involve any environmental impact and therefore does not require an EIS.

34-2 In addition, RMOGA has major concerns over the assumptions, methodologies and conclusions of the draft EIS. Grave concern exists over the formulation and development of alternative scenarios. Moreover, if as stated by the BLM; maximum resource recovery would occur under unitized development, it is erroneous to conclude that production levels under individual projects would exceed the production level under the unitized development scenario. In fact it would be expected that individual projects with boundary offsets and limited or

34-3 partial conversion would result in substantial reduction in levels of production and ultimate resource recovery compared to the unitized alternative. The erroneous assumption of such an unattainable production level and recovery results in substantial overstatement of the impacts of develpment on pollution levels, water requirements, socioeconomic and other values. Such overstatements may lead to erroneous conclusions on the part of the public and decision makers and lead to unsupportive decisions on conversion and development.

34-4 RMOGA questions the justification for and supportability of a partial conversion alternative which precludes development of acceptable mitigation measures or rebuttal of BLM assumptions. Such an alternative effectively forecloses the opportunity for development of technology or other alternatives which would obviate the restrictions established. Moreover, legitimate objections may be raised to certain of the assumptions and restrictions defined by BLM on the basis of accuracy and legality. Such objections are not permitted by the arbitrary definition of an alternative unsupported by development plans or other reasonable levels of development.

34-5 RMOGA has substantial concerns over the application of a worst case analysis with regard to the Sunnyside conversion. It appears that BLM has conducted this analysis for potential effects that may well be highly remote or unlikely. This approach appears to be inconsistent with recent pronouncements by the Council on Environmental Quality and can lead to substantial overstatement of impacts and erroneous and unsupportive conclusions by the public and decision makers.

RMOGA is also concerned with the lack of emphasis placed on the benefits accruing to energy security and economic growth associated with tar sands development. These matters are treated very superficially by the draft EIS and no attempt is made to systematically compare the benefits foregone by limitations on development. Such treatment biases the report in favor of limitations on development.

In summary, RMOGA considers that the draft Environmental Impact Statement is fatally flawed with regard to assumptions, methodology and conclusions, erroneously applies current NEPA policies and substantially overstates the impacts of tar sands development. Such practices establish unacceptable precedents for the tar sands industry and the development of secure energy resources for the nation. RMOGA accordingly recommends the draft EIS be revised to correct the errors cited above and that the principles enunciated herein be properly applied to future analyses of tar sands development. RMOGA is prepared to assist the BLM in this effort.

Thank you for the opportunity to comment on this important matter.

Sincerely,

Jack Swenson

JGS/pr

RESPONSES TO COMMENT LETTER 34

34-1 Tbe Combined Hydrocarbon Leasing Act provides that lease conversion decisions must be based on diligent development and reasonable protection of the environment. Diligent development is defined by regulation and policy. Reasonable protection of the environment is determined by analysis in an environmental assessment (EA) or EIS, which leads to protective stipulations in a lease. A decision to convert a lease depends on the extent to which sucb stipulations can assure reasonable protection of the environment in carrying out the plan of operations.

The Combined Hydrocarbon Act does not provide exemption from the National Environmental Policy Act.

34-2 Tbe total of the individual projects is what the companies have proposed on an individual basis. A unitized mine plan would recover more resources as stated in the comment. Furthermore, any number or size of plants could be assumed witb a unitized mine. In the scenario, analyzed the 50,000 bpd plant was presented by the companies as the optimum plant size.

34-3 See response to comments 33-3.

34-4 See response to comment 33-2.

34-5 See response to comment 33-45.

Comment Letter 35

United States Department of Agriculture
Forest Service
Intermountain Region
324 25th Street
Ogden, UT 84401

Reply to: 1950

Date: FEB 7 1984

Mr. Gene Nodine
District Manager
Bureau of Land Management
P.O. Box 970
Moab, UT 84532

Dear Mr. Nodine:

The Draft Environmental Impact Statement for the Sunnyside Combined Hydrocarbon Lease Conversion has been reviewed by the Ashley, Manti-LaSal, and Wasatch-Cache National Forests and various resource Staff Groups in our Regional Office.

35-1 There are no additional comments to those submitted during the review of the Preliminary Draft Environmental Impact Statement that we forwarded to you on August 29, 1983. We appreciate your recognition of our earlier comments and their consideration in the preparation of this Draft. We also appreciate the opportunity to participate on the project steering committee; this enabled early input of Forest Service concerns.

Sincerely,

J. C. Rasleer
for J. S. TIXIER
Regional Forester

FS-6200-11b (7/81)

RESPONSE TO COMMENT LETTER 35

35-1 Thank you for your comment. It will be considered in the decision making process.

Comment Letter 36

WAS

AFRICA • ALASKA • SOUTH AMERICA

Western Adventure Safaris, Inc.

BOX 1732 • GRAND JUNCTION COLORADO 81501 • PHONE (303) 242-5031 243-7461

Box 3C58 Steamboat Spgs, CO 80477 (303) 879-2039

6, Jan. 1984

BLM District Office
Box 970
Moab, UT 84532

Re: Sunnyside Combined Hydrocarbon Lease Conversion

Dear Sirs:

Please be advised that we stand firmly against the above mentioned proposed leasing. The reasons are as follows:

36-1 There would be very substantial impact on the exsisting water resources. We believe that the EIS Draft has underestimated what impact to surface waters aod aquifers would develop. The water ecology in the proposed area is very delicate. The amounts of water necessary to run their operation will severely deplete the waters oecessary for ecological balance. The water quality will be degraded which is not tolerable.

36-2 It has been stated that there would be some wildlife habitat lost forever, some for 100 years and some for only a few years. We do not feel that this is acceptable. No one, not even a large company has the right to deny wildlife on public lands which belong to the public.

36-3 These proposed leases would deny Wild and Scenic designation on the Green River. We believe that this area should be protected and preserved. There are few areas left that allow the intimacy with nature, the space to feel freedom, and the unsurpassed scenery that Desolation-Grey Canyons offer. The public should have the right to experience this without the multitude of impacts that the above named leases would create.

36-4 The Visual impact is also an issue. With 36,000 acres of soil and vegetation being destroyed, it will be impossible to igoore. Then there is the visual impact of the machinery at each site. Oo a river trip we believe the customer will find this quite an "eye sore". People choose the Green River trip to get away from such "eye sores". We feel this visual impact will deter people from these tours and impact the economy of the River Industry. The River Outfitting Industry is a substantial one. It provides a permanent economic base as well as attracting tourist for a seasonal base. This industry will be damaged if development of the conversion areas are allowed.

We respectfully request that the Sunnyside Hydrocarbon Lease Conversion be deoied.

Sincerely,

Mark Griffith

Mark L. Griffith
President

MLG/rb

COMPLETE OUTFITTING AND GUIDING FOR BIG GAME HUNTING, FISHING, BACKPACKING,
TREASURE HUNTING, GEOLOGICAL EXPLORING, RIVER TRIPS
SPECIALIZING IN COMPLETE INTERNATIONAL EXPEDITIONING AFRICA, ALASKA, SOUTH AMERICA

RESPONSES TO COMMENT LETTER 36

36-1 The EIS has predicted substantial impacts to water resources (see Section 3.A.1). The analysis of impacts on water resources is based on the conceptual project descriptions furnished by the applicants. These descriptions provide little information on the exact location and extent of the tar sand resource and its relationship to watersheds. If a lease is converted, more site-specific environmental analysis will be required, which will be based on firm plans of operations. Current project information reveals that flows in the Green River would be reduced by less than 1 percent. The EIS analyzes degradation of water quality (see Table 3-2, Section 3.A.1). Section 4.B, Monitoring, covers water pollution control and permit requirements for water quality control.

36-2, 36-3 Thank you for your comments. Your concerns will be considered in the final decision.

36-4 The recreation and visual resource sections have been revised to reflect these concerns.

Comment Letter 37

Sheri Griffith River Expeditions

Jan. 13, 1984

Central Reservations: Box 3088 • Steamboat Springs, Colorado 80477 • (303) 879-2039
Utah Office: 59 South Main Street • Moab, Utah 84532 • (801) 259-8229

BLM District Office
Box 970
Moab, Utah 84532

Dear Sirs:

I would like to go on record against the Proposed Sunnyside Combined Hydrocarbon Lease Conversion. The reasons are as listed below:

37-1 1. There is not nearly enough technological development at this date to support this type of development. I suggest this type of development be researched on private lands and when the procedure is refined, and the economic viability proven, at this time let the applicant return and reapply for the leases. I believe we are looking at 10 years down the road. In terms of land and lease value, surely our government lands will be worth more and the BLM would be paid the current value and derive a better profit from this private use of public lands.

37-2 2. There would be substantial impact on exsisting water resources. The water quality would be degraded. The quantity of water would decrease considerably. I do not feel the proposed area can or should take this kind of impact. I also believe that there will be more impact than the EIS has implied, far more.

37-3 3. It is stated that there would be a 100 year loss of habitat to wildlife and some habitat would be lost forever. This loss is not acceptable.

37-4 4. These leases and consequent developments would disallow for the potential of Wild and Scenic River designation on the Green River. I think it is imperative to protect this unique area. There are few places left in the U.S. that allows people freedom from modern man and his technology.

37-5 5. The River Outfitting Industry and the private river user provide an economic base for many areas in Utah because of the Green River (Desolation-Grey Canyons). The employees of these industries live in these communities; the Outfitting Industry attracts Tourism to the areas. Because of all the reasons above stated, as well as impact to fishes, endangered species, decreases air quality, visual impact of machinery, and land and vegetation destruction, the proposed leases would substantially impact the economy of this Industry.

For the above mentioned reasons, I request that the Sunnyside Combined Hydrocarbon Lease Conversions be denied. At the very least, they should be put on hold until technology can catch up with the drawing board and until it becomes economically feasible.

Sincerely,

Sheri L Griffith

Sheri Griffith

SLG/rh

RESPONSES TO COMMENT LETTER 37

37-1	See response to comment 10-1.
37-2, 37-3, 37-4	Thank you for your comments. Your concerns will be considered in the final decision.
37-5	The recreation section has been revised to reflect these concerns.

Comment Letter 38

Standard Oil Company (Indiana)
200 East Randolph Drive
Post Office Box 5910A
Chicago, Illinois 60680
312-856-6548

D.W. Robinson
Manager, Synthetic Fuel Programs

February 1, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
Post Office Box 970
Moab, Utah 84532

Dear Mr. Nodine:

Attached are Standard Oil (Indiana)/Amoco Production Company's comments on the Draft Environmental Impact Statement for the Sunnyside Combined Hydrocarbon Lease Conversion. We have prefaced the list of comments with a general statement about the possible impact of the document on development in the Sunnyside Special Tar Sands Area.

Sincerely,

D. W. Robinson

Attachments

STANDARD OIL COMPANY (INDIANA)/AMOCO PRODUCTION COMPANY
DRAFT EIS FOR SUNNYSIDE COMBINED HYDROCARBON LEASE CONVERSION
GENERAL COMMENTS

Attached are 35 pages of detailed comments on specific items contained in the DEIS. As a general statement, we believe the tone of the DEIS could bias the public and the BLM decision makers against developing the Sunnyside Special Tar Sands Area (STSA). Because of the "worst case" method of analysis used in the document, the environmental impacts presented are inflated and unrealistic. No environmental controls or mitigation measures have been included in the analysis in spite of protection measures already required by existing federal, state, and local laws and regulations. Moreover, the analysis ascribes a higher level of certainty to impacts than justified when considering that tar sands technology is in the early stages of development. The "worst case" method of analysis also appears to be at odds with proposed guidelines issued by the CEQ in August of 1983 which require a probablistic approach to impact analysis.

38-1 In the "Proposed Actions Alternative", impacts are even further overstated by assuming production from all surface mining projects is additive. This is incorrect because some of the plans of operations envisioned some degree of unitized or cooperative development of the Sunnyside STSA.

38-2 The "Partial Conversion Alternative" appears to be unjustificable and unsupportable because it preempts the rights of applicants to develop acceptable mitigation measures for the impacts cited. Moreover, it is unlikely that total production under the "Partial Conversion Alternative" would exceed that under the "Unitized Development Alternative". Thus this scenario overstates the impacts which would result from such an alternative.

38-3 The "Unitized Development/Preferred Alternative" suffers from the same defects as the "Partial Conversion Alternative" because it imposes restrictions on development which preclude negotiations or development of acceptable mitigation measures by developers. Again, the restrictions in most cases appear to be unjustified or unsupported.

Serious deficiences were found in the air quality data presented in this DEIS. As a result of a review of the source document for these data (Air Quality Technical Report - Aerocomp, November, 1983), we think that the conclusions reached regarding air quality impacts are in error because of flawed or inappropriate analysis techniques and inaccurate emission inventory data. In the next section, we have provided the BLM with 24 pages of detailed comments resulting from this review.

STANDARD OIL (INDIANA)/AMOCO PRODUCTION COMPANY

Comments on Draft EIS--Sunnyside Combined Hydrocarbon Lease Conversion

	Page	Col.	Para.	
38-4	S-1			In general, we do not think that the summary incorporates the protection that existing laws and regulations provide with regard to limiting many of the impacts. Also not enough consideration is given to potential mitigation measures.
	S-2	1	1-3	Statements made in this section appears to be inconsistent. At first, the draft envi.onmental impact statement (DEIS) states that flows would decrease in the Price and Green Rivers as a result of resource development. The DEIS then states that the Price and Green River are not expected to have great changes in flow due to requirements for process water. It is then stated that the Price River could have a 28 percent reduction in flow. This is very confusing.
	S-4	2	6	Not all mitigating measures enforceable on lands administered by federal, state, and local agencies are taken into account by the DEIS. If this were the case, violations of air and water quality limitations would not be predicted.

-2-

Page Col. Para.

38-5
1-1 1 2 As stated by the Bureau of Land Management (BLM), the proposed projects are very conceptual and the impact analysis was based on minimal data and numerous assumptions. Reflecting the uncertainties inherent in such an analysis, the BLM should change the verb 'would' to 'could'. The verb 'would' used consistently in the DEIS for predicting impacts attaches a greater degree of certainty to impact occurrence and magnitude than can be supported by the impact analysis' data base. By using 'could', the proper degree of uncertainty is implied, and the reader is given a more accurate perspective on potential impacts.

38-6
1-23 1 4 We certainly agree that it was necessary to make assumptions for aspects of the commercial tar sands operations that were not clearly defined in the plans of operation. We disagree, however, with the "worst case" method of analysis used throughout the draft EIS. This method appears to be at variance with the guidance proposed by the Council on Environmental Quality (CEQ) in August of 1983. The CEQ specified that the application of the worst case analysis methodology should also consider a reasonable probability in an

-3-

Page Col. Para.

38-6 (cont.)
evaluation. The worst-case analysis misleads by presenting inflated environmental impacts which have no probability of occurrence. It assumes no environmental controls or mitigation which is not reasonable and predicts impacts which can never happen (i.e., PSD increment exceedence). Tar sands development in the Sunnyside Special Tar Sands Area (STSA) even on private land is not possible without strict adherence to environmental law and regulations. Leasing stipulations would add additional controls to development on federal land. Since the worst case is an improbable scenario, why is it used for this analysis?

38-7
1-24 1 2 The reference to Tables 1-11 and 1-12 in the text should be changed to Tables 1-9, 1-10, and 1-11.

38-8
1-26 2 4 Because the stripping ratio is very low in the proposed pilot mine site, overburden removal and ore mining can be accomplished in one year, not the two years cited in this paragraph.

38-9
1-26 2 5 The proposed pilot mine will be located in the NW 1/4 of Section 33, R14E TS13S, not the NW 1/4 of Section 33, R14E TS14S.

	Page	Col.	Para.	
38-10	1-28	2	1	There is a typo here. The commercial processing plant proposed location is in Section 35, TS13S R14E, not TS135 R14E. The proposed location is also shown incorrectly on Map 1-2.
38-11	1-29	1	2	Amoco would also continue with ecological baseline studies, identify probable impacts and formulate appropriate mitigation strategies, and develop a reclamation (revegetation) program.
38-12	1-41	1	All	1.0 Partial Conversion Alternative and/or Special Mitigation should be removed in its entirety. This scenario appears to be unjustifiable and unsupported in that it preempts tbe rigbt of the applicants to contest or develop acceptable mitigation measures for the impacts cited. if this scenario is not eliminated, more mitigation measures should be presented. These should not include tbe stipulations presented in Chapter 4.
38-13	1-43	1	2	How much of the designated critical areas a Map 3-5 and eliminated areas shown on Map 1-5 can actually be seen from Highway 6 and from valley areas south and west of the STSA? These areas on Maps 1-5 and 3-5 are largely unviewable by most observers travelling tbrougb the area.

	Page	Col.	Para.	
38-14	1-44	2	5	As stated in this paragrapb, conversion of leases would not be permitted if the environmental impacts of tar sand development were considered too great. However, the worst-case analysis used for this DEIS results in unrealistically bigh environmental impacts. The DEIS, therefore, is biased towards tbe No Action alternative.
38-15	1-45	1	1	Amoco could also elect to develop a tar sand operation on its private land within the STSA.
38-16	1-45	Table 1-6		In Table 1-6, annual tonnage of ore mined in the Amoco commercial project is listed at 105MM tons. This is incorrect. Data submitted for EIS preparation states tbat between 300M and 600M tons per day of total material would be moved. These figures include overburden, interburden, and tar sand ore. Over the life of the project, daily average ore mining requirements are 155.6M tons per day or 54.4MM tons per year, not tbe 105MM tons per year used in the table. Thus collective and cumulative totals for all applicants are overstated as is the calculated total mining requirements for tbe "Amoco" project over tbe assumed 30-year life.

	Page	Col.	Para.	
38-17	1-46	Tahle 1-7		Assuming Chevron-GNC's commercial operation and the interrelated project are one and the same, 4,500 ac-ft/yr should be suhtracted from the total water demand for the proposed actions. Table 1-7 should be revised accordingly. If the water demand in Tahla 1-8 has heen douhle-counted for the Chevron-GNC and interrelated projects, then this tahle also should be adjusted.
38-18	2-1	Table 2-1		Total production from the Unitized Development is one hillion harrels less than the collective total for the Proposed Action. On pages 5-6 (second column, last paragraph) and 1-44 (first column, first paragraph) the BLM cites more complete and efficient resource recovery as one of its reasons for preferring this alternative. This is undeniably true, yet the BLM assigns one billion barrels less production using more acreage (35,945 acres) for the proposed actions as opposed to 38,845 acres for a unitized development. This difference in total production would have a significant hut unrealistic negative effect on a cost-henefit analysis. Also, one would expect the impacts listed in Table 2-1 for the Unitized

	Page	Col.	Para.	
38-18 (cont.)				Development Alternative to he much less than those listed for the Proposed Actions Alternative. This is not apparent even though the BLM discusses in DEIS Section 2.B (pages 2-4 and 2-6) impact mitigating aspects of a unitized development. This discussion should he reflected in Tahle 2-1. As presented in the DEIS, the tahle gives the impression that impacts for proposed actions and a unitized development are relatively equal in magnitude. This is misleading particularly since a tahle summary of a comparison of impacts should essentially stand alone without support text.
38-19	2-5	Figure 2-1		Reclaimed land should be included on Figure 2-1. It should he clearly indicated on Figure 2-1 that contemporaneous reclamation is following land disturhance.
38-20	3-1	1	3	We agree with the BLM that exploration activities should not result in any significant impacts to the environment. Because of this, we don't understand why the restrictive exploration stipulations given as mitigation measures (designated as Nos. 9 and 10) are mandated in Chapter 4, page 4-3, of this DEIS. These measures

	Page	Col.	Para.	
38-20 (cont.)				seem unnecessary in light of the statements in this paragraph.
38-21	3-1	1	4	Section 1.D.2 referenced in this paragraph does not appear in the DEIS.
38-22	3-1	1	4	The impact analysis did not assume that mitigation measures enforceable by regulatory agencies would be implemented and, therefore, would alleviate or minimize impacts. The impact analysis assumed worst-case conditions which did not allow for any required regulatory compliance or impact mitigation. For example, the DEIS predicts PSD increment and NAAQS violations as well as violations of the state water quality standards. Also, current mining and land leasing regulations would not allow the erosion and sediment problems predicated by the DEIS. It is very misleading to present these impact magnitudes and also state that the impact analysis took enforceable regulations and mitigation measures into account.
38-23	3-1	2	2	By definition (see the last paragraph, first column, page 3-1) violations of Standards of Water Quality can not occur. Therefore, this impact

	Page	Col.	Para.	
38-23 (cont.)				significance criterion should be changed to reflect actual possibilities.
38-24	3-3	1	1	The erosion rate of 49 tons/acre should not be mentioned in the test if this rate is unrealistic and dismissed from any consideration. Back-up documentation and justification for the 6.9 tons/acre erosion rate should be provided to allow the reader to assess the validity of this estimate. Appendix A-7 does not explain how a 6.9 tons/acre erosion rate was derived.
38-25	3-3 3-3 3-4 3-5	Table 3-2 2 2 2	 1 4 4	Project area water discharges and other project-related downstream effects cannot by law cause any violations of the state water quality standards or water use classes. The potential to exceed water quality standards and violate water use classes criteria in Grassy Trail Creek, Range Creek, and Nine Mile Creek is zero. It would be unreasonable to assume that any development could proceed without any necessary treatment prior to discharge of waste and run-off water to maintain existing downstream water quality. Also, presumably solid waste disposal would only be allowed with assurances that leachates would not significantly

	Page	Col.	Para.	
38-25 (cont.)				degrade watar quality. Assumptions regarding erosion control were included in the water resources impact analysis (page 3-3, column 1, paragraph 1). Likewise, assumptions regarding any necessary surface water treatment and groundwater protection measures also should ba incorporated into the analysis.
38-26	3-3	2	1	What is the basis for stating that TDS concentrations would be expected to increase from 250-451 mg/l to a level of 1,000 mg/l?
38-27	3-4	1	2	Water from springs in mined araas would not simply go into surface flow. Most of this water would seep into the open pit and would have to be pumped-out. This mine water would then be used for process water, tailings compaction, discharge to surface streams, etc. Whatever its use, regulatory authority would assure that existing downstream baseflows and water quality is maintained. Prior to being discbarged, any mina water (and any other discharged water) would be suitably treated, if necessary. This is standard mining practica and required by regulatory authority.

	Page	Col.	Para.	
38-28	3-5	1	3	The description of predicted topographic changes for the Range Creek watershed does not agree with the 'minor topographic alteration' given in Table 3-2. One or the other should be adjusted so that both agrea.
38-29	3-4 3-5 3-5	2 1 1	1 1 4	The analysis should assume tbat adequate measures to maintain existing surface water and groundwater quality and flows would be required by regulatory authorities for any development with the Range Creek watershed. There is no basis for assuming that any development could proceed without being in regulatory compliance.
38-30	3-5	1	1	It is inconceivable that federal and state regulators and county and local authorities would allow Ranga Creek to be completely dewatered. This does not seem to be a remote possibility even under the most extreme worst-case analysis.
38-31	3-5	1	4	By maintaining Range Creek basaflows and water quality, davelopment in the upper watershed would not significantly affect existing downstream water users.

	Page	Col.	Para.	
38-32	3-5	2	4	For the reason previously given, development in the upper Nine Mile Creek watershed would not violate downstream water quality standards.
38-33	3-6	1	2	This statement regarding significant impacts of Nine Mile Creek water uses is not supported by the analysis nor summary table (Table 3-2) of watershed impacts. It should be modified, accordingly.
38-34	3-6	2	4	The statement regarding significant impacts to water uses in the watershed tributaries to Green River is unsupportable by the analysis presented in the section entitled, <u>Watersheds Tributary to the Green River</u> nor the summary table (Table 3-2) of watershed impacts. None of the impact significance criteria are exceeded. The analysis predicts no noticeable surface water effect on TDS, sediment loading, flow, or water quality standards. Also predicted are no effects on groundwater and flood plains. This statement, therefore, should be modified, accordingly.
38-35	3-9 Table 3-4			A TDS change of ± 1 mg/l for the Green River would mean a change of ± 0.3 - 0.1 percent to the

	Page	Col.	Para.	
38-35 (cont.)				existing range of salinity (300-800 mg/l). For a proper perspective, these percentages should be added to Table 3-4. Also, the DEIS should discuss the significance of this predicted change. It does not appear to be significant and, if so, it should be so stated. Table 3-4 says that Range Creek flows would be depleted by 100 percent and resulting TDS values would undergo a large increase. This appears to be a contradiction. If TDS increases, then flow must be present and a 100 percent reduction could not have occurred. Also, as previously stated, how reasonable is it to assume that Range Creek would allow to be dewatered by a tar sand development?
38-36	3-9	1	1	Because most of the DEIS socioeconomic impact analysis was extracted from the <u>Socioeconomic Technical Report: Sunnyside Tar Sand Area Development Analysis</u> (Argonne National Laboratory 1983) we also reviewed this report. However since the report contains little content other than the results of the socioeconomic model, it is difficult to review and comment on the projected socioeconomic impacts. Also, important summary tables for projected impacts are missing. They are Tables 4.20, 4.21, 4.22, 4.23, 4.24, and 4.25.

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Page	Col.	Para.	
38-37 3-9	2	1	Why is the significant impact criteria based on population growth over baseline? A more proper criteria would be significant lags in certain service demands and the ability of local municipalities to provide them in a timely manner. Population growth even five percent above a projected baseline figure is not necessarily an adverse impact.
38-38 3-21	1	3	Criteria No. 2 (weed invasion) is not addressed in the impact analysis and, therefore, should be deleted.
38-39 3-26	1	2	Based on the impact significance criterion, the only significant vegetation impact would be the inability of achieving preconstruction diversity for aspen communities (criteria No. 2). This potentially could affect 4,480 acres out of a total of 38,845 acres. All other vegetation types would recover. However, some could require up to 50 years. Impact significance criteria No. 1 is not predicted to be exceeded by any disturbed area. As stated previously, criteria No. 2 is not addressed.

Page	Col.	Para.	
38-40 3-32 3-34 Table 3-13	2 1	3 1	We do not agree with the BLM's assumption that reclaimed land will be valueless for wildlife for at least 20 years for initial reseeding. This is not true. It is not necessary to obtain predisturbance vegetation diversity before vegetation can provide suitable wildlife habitat. Nevertheless, tbe BLM assesses a complete babitat loss of 38,845 acres for project life (75 yrs.) plus 20 years. Even with the BLM's 20-year vegetation development assumptions, suitable reclaimed wildlife habitat would start becoming available from 22 to 25 years after start of construction. From that time on, more and more 20-year old reclaimed land areas would become availabla for wildlife habitat. The BLM should take this accumulating amount of preconstruction-level vegetation diversity habitat into account when predicting wildlife habitats. Cumulative reclaimed acreages sbould be added to Figure 2-1 to aid in this impact analysis.
38-41 3-32	2	3	We agree that estimates of total habitat acres disturbad at any one time on a steady-state basis are misleading for assessing wildlife impacts. The estimates probably lead to underestimations of

	Page	Col.	Para.	
38-41 (cont.)				certain wildlife impacts. We also believe that the BLM's assumption concerning the magnitude of habitat loss lead to over-estimations of wildlife effects.
38-42	3-33	1	2	If no fawning areas have been identified to date, then the restrictive mitigation measure designated as No. 9 in Chapter 4 of this DEIS is unwarranted at this time.
38-43	3-35	1	1	Since an 11 percent reduction is based on no credit given to reclaimed habitat, it is an over-estimate. Loss of revenues from hunters would be less than 11 percent of $2,915,777 per five years.
38-44	3-35 through 3-38			Small game, furbearers, reptiles and amphibians, birds, and wild horses. As for big game, these wildlife losses were simply determined by subtracting total land disturbed from total habitat in the STSA. Again, no account was given to reclaimed land providing suitable habitat. This type of analysis over-estimates wildlife impacts and should be corrected.

	Page	Col.	Para.	
38-45	3-38	2	1	Standard operating practices including run-off and erosion control, treatment of discharged water and maintenance of downstream water quality and flow conditions would protect downstream fisheries.
38-46	3-39	1	2	This short paragraph is typical of the leaps that the impact analysis takes from uncertainty to certainty. The paragraph begins by saying that adverse impacts are possible to Colorado sqawfish. The next sentence says that 'losses' (adverse impacts do not necessarily mean losses particularly when it is not certain that these impacts will occur) cannot be estimated. The paragraph ends by saying that these uncertain, unquantifiable impacts would be significant. This type of logic and analysis is found throughout the DEIS.
38-47	3-40	1	1&2	A review of the topographic maps shows that the majority of the "Bruin Point View Area" is privately owned surface. Any reference to visits to this area are most likely encouraging trespassing on private property. Although Amoco/Standard have not prosecuted trespassers up to this point, any references to visits on private land should be deleted from the EIS.

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Page Col. Para.

38-48

3-44 2 1 We have reviewed the Air Quality Technical Report for the Sunnyside Combined Hydrocarbon Lease Conversion prepared by Aerocomp dated November, 1983. As a result of this review, Amoco feels very strongly that the conclusions reached in this report are extremely inaccurate, purely speculative in nature, and do not reflect the air quality consequences of the resource development. We think that the conclusions which have been reached are in error, because of flawed or inappropriate air quality analysis techniques and an inaccurate emission inventory data. One basic premise which was totally overlooked and neglected throughout this analysis is that existing environmental regulations will not permit deterioration of air quality to the levels projected in this report (this is assuming that the projections made in this report are reasonable which, in our opinion, they are not). Thus, resource development would be curtailed prior to air quality being allowed to deteriorate to the levels projected.

Page Col. Para.

38-48 (cont.)

As a result of the serious deficiencies found in the Air Quality Technical Report, the air quality data presented in this DEIS for the Sunnyside Hydrocarbon Lease Conversion is also seriously flawed and inaccurate.

It is very important to ensure that initial resource development is not overly restricted as a result of a totally inaccurate projection of the air quality. Thus, we think that the air quality technical report and the DEIS for the Sunnyside Combined Hydrocarbon Lease must be corrected to reflect our comments.

To maintain the continuity of the DEIS review comments, we have attached our air quality technical report review at the end of these comments.

38-49

3-45 Table 3-16 The total suspended particulates (TSP) standard is expressed as an annual geometric mean. The SO_2 and NO_2 annual standards are expressed as an arithmetic mean. This table needs to state that the annual TSP standard is an annual geometric mean. The 160 ug/m^3 hydrocarbon standard has been rescinded by the EPA.

Page	Col.	Para.	
3-47	2	3	38-50 Since Map 3-6 represents an annual arithmetic mean concentrations, these data cannot be compared to the secondary NAAQS of 60 ug/m^3 (annual geometric mean). The assumption of a uniform background concentration of 20 ug/m^3 applied over the entire region is unfounded.
3-50	Table 3-18		38-51 It is not clear if the projected annual SO_2, TSP, and NO_2 concentrations are annual arithmetic or geometric means. We feel that these projections are pure speculation as a result of the uncertainties associated with these analyses[1].
3-50	1	2	38-52 Current EPA regulations permit increases in TSP above EPA significant levels 1 ug/m^3 annual geometric mean or 5 ug/m^3 24-hour average), without having to conduct a detailed impact analysis. However, new sources may not exceed applicable PSD increments or NAAQS. The discussion in the paragraph with respect to significant TSP values is inaccurate. Since projected emissions from the proposed Amoco surface mine and related activities are at best

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Page	Col.	Para.	
			38-52 (cont.) very speculative, comparison of PM emissions to the city of Price is meaningless.
3-50	2	1,2	38-53 Projected NO_2 levels are based on inaccurate emission inventories and inappropriate modeling methods, therefore, comparison to NAAQS is not appropriate.
3-51	2	1,2	38-54 NO_2 is more likely to be a precursor of acidic deposition than NO_x (NO + NO_2). The assumption that "all nitrogen compounds were assumed to be NO_x" is not reasonable. Similarly, "the settling velocity of NO_x..." is not technically correct. We think that the annual deposition rates calculated are overly conservative. The frequency of occurrence of the worst case meteorology must be used to determine the annual average deposition rate, not simply the wind direction frequency distribution. By assuming the annual deposition rate based solely on wind direction frequency assumes that every time a wind directs a plume from the Sunnyside development towards a sensitive receptor that the other meteorological parameter

Page	Col.	Para.	
38-54 (cont.)			controlling deposition (such as wind speed and atmospheric stability) are identical to the assumed worst 24-hour period. This is not a reasonable assumption.
38-55 3-59	1	4	We don't understand how the construction of a speed-loading facility will result in a significant long-term impact?
38-56 3-59	2	1	It is doubtful that this project will cause any diverse financial impacts to the railroads. Facility expansions that are not economic will not be undertaken.
38-57 3-60	2	4	Significant cropland losses should occur if five percent of the total cropland in the STSA is irreversibly converted to other uses. Not merely five acres of land presumably of any type as given in this paragraph.
38-58 3-61	1	4	The loss of 387 AUM's of forage per year does not seem to be a significant decrease in grazing land as stated in this paragraph.

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Page	Col.	Para.	
38-59 3-61	2	1	All available grazing areas within the STSA would not be subject to disturbance for approximately 74 years. Impacts to grazing would depend on locations of surface facilities, mining plans, and reclamation schedules. Some percentage of the total grazing areas would be available at any one time. Revegetation of reclaimed land could significantly increase the amount of grazing land.
38-60 3-62	Table 3-25		Table 3-25 should also include the actual number of cows affected. For example, the Dry Canyon AUM impact would amount to 109 cows being excluded for the four-month grazing season. This is not a significant impact.
38-61 3-63	2	3,4	Please document the source for disturbed cropland acreages.
38-62 3-68	2	3	Existing water quality and flows of Range Creek downstream of any development activities would be maintained by appropriate environmental control and monitoring measures as well as regulatory compliance requirements. Therefore, water quality would not be degraded in the Turtle Canyon and Desolation Canyon USA's.

Page	Col.	Para.	
38-63 3-70	Table 3-26		The potential for exceeding state water quality standards in Nine Mile Creek is zero.
38-64 3-71	Table 3-27		The total water withdrawal for the proposed action was 40,345 ac-ft. Water withdrawals for the partial conversion alternative are estimated at 25,238 ac-ft. Comparing Table 3-27 with Table 3-4 shows that predicted impacts on the Price River and Green River TDS's is the same for both the proposed actions and partial conversion alternative. How accurate can a ± mg/l estimate be when it is predicted for two water withdrawals having a difference of 15,087 ac-ft?
38-65 3-87	1	2	Based on the analyses presented in the technical support report for air quality, it is impossible to conclude that NAAQS for TSP would be exceeded.
			Because the estimated TSP concentrations are so speculative, it is not possible to determine what types of fugitive dust control would be necessary or applicable.
38-66 3-87	2	1	PSD increment excursions for SO_2 and TSP are based on inaccurate emission inventories and

Page	Col.	Para.	
38-66 (cont.)			overly conservative modeling analyses. Conclusions regarding mitigation techniques, such as increased stack height, or relocation of a facility, are premature.
38-67 3-87	2	2	Projected NO_2 levels are based on inaccurate emission inventories and inappropriate modeling methods, therefore, comparison to NAAQS is not appropriate.
38-68 3-92	1,2		The discussion of rail and pipeline transportation is based entirely on production levels. This discussion should also include an examination of shipping costs.
38-69 3-95	2	3	It is unlikely that surface water would be the primary source of processing and waste disposal water for unitized development. The Price or Green rivers would remain the primary water sources.
38-70 3-108 Table 3-45 3-109	2 1	1 1,2	Based on the analyses presented in the technical support report for air quality, it is impossible to conclude that NAAQS for TSP would be exceeded. Because the estimated TSP concentrations are so

Page Col. Para.

38-70 (cont.)

speculative, it is not possible to determine what types of fugitive dust control would be necessary.

PSD increment excursions for SO_2 and TSP are based on inaccurate emission inventories and overly conservative modeling analyses. Conclusions regarding mitigation techniques, such as increased stack height, or relocation or a facility, are premature.

Projected NO_2 levels are based on inaccurate emission inventories and inappropriate modeling methods, therefore, comparison to NAAQS is not appropriate. Until specific proposals and environmental protection measures are evaluated, it is not at all certain that an activity cannot proceed without unacceptable adverse impacts. Certainly, the upper Range Creek watershed is able to support tar sand development which also provides for protection of downstream water uses.

38-71

4-1 1 3 The no-discharge mitigation measure is unwarranted and most likely counter-productive. Water discharges should be allowed. If deemed necessary, suitable treatment of water prior to

Page Col. Para.

38-71 (cont.)

discharge would maintain downstream water quality as well as base flows. Downstream flows would decrease significantly under the no-discharge measure. Decreased flows would adversely affect both water quality and aquatic habitat. Normal run-off and sediment control practices as well as groundwater protective measures are standard procedures in the mining industry and are adequate to protect downstream water resources.

38-72

4-1 2 1 Occupancy or other surface activities should not be categorically excluded from areas within the STSA. Instead, specific activities or uses proposed for areas on a case-by-case basis.

What constitutes land disturbed by surface mining? Does the 25 percent disturbance limitation only apply to active mining operations or does it also include land being reclaimed? Also, the BLM should clearly define what is meant by 'completed' reclamation and 'revegetation substantially advanced'. Depending on the BLM's interpretation of these terms, this stipulation could cause inordinate delays in mining operations; delays whose costs may not be commensurate with the

Page Col. Para.

38-72 (cont.)

environmental protection afforded by this stipulation.

The BLM should not place an overall arbitrary upper limits on land disturbances which may or may not accomplish the BLM's management goals.

38-73

4-1 2 2

The BLM should define what is meant by 'complete' hydrological testing and evaluation. In many areas of the STSA complete testing and evaluations may not be feasible and most likely unnecessary to predict impacts and develop suitable mitigation measures. The BLM should require not complete hydrological investigations but a level of investigations which would be adequate to reasonably describe base-line conditions, predict impacts, and formulate effective environmental protection and mitigation plans.

38-74

4-1 2 4

The limitations of 25 percent of any given lease area being disturbed at any one time should not be taken as an absolute restriction. Depending on depth of various tar sand zones, a larger area may be required for safe and efficient open pit mining of this resource. The 25 percent limitations

Page Col. Para.

38-74 (cont.)

should be used as a guideline to be applied whenever feasible.

38-75

4-1 2 5

Off-site enhancement of similar habitat in exchange for disturbance in aspen communities should be a negotiable mitigation concept and not an absolute stipulation. Recognizing that aspen communities provide wildlife habitat, it does not follow that all aspen communities have equal wildlife value. Their usefulness to wildlife depends on such factors as adjacent habitat, size, and availability to name a few and off-site enhancement cannot be approached on a one-to-one basis. Also, the BLM needs to develop a framework of terms and conditions for off-site enhancement and take into account potential off-site enhancement areas and management responsibilities.

38-76

4-3 1 3&4

These two mitigation measures would prevent any recovery of the tar sand resource in nearly all of the lease conversion areas. They should either be eliminated or substantially modified to allow exploration, drilling, and other development activities with appropriate and reasonable measures to protect deer and elk. Also, the BLM

301

Page Col. Para.

38-76 (cont.)

should define 'other development activity'. In normal usage, development means the actual construction of the mine, process plant, and ancillary facilities. Presumably the BLM means development to associated with exploration and planning activities.

These two mitigation measures would confine all exploration and development to the winter months. Weather conditions would largely preclude access and any other activities in the STSA between November 1 and May 15. The only practical time for exploration is during the excluded summer season. If these activities were attempted during the winter season, they would be inherently hazardous to personnel, extremely time consuming and costly, and would cause a significant amount of environmental damage. Past experience has demonstrated that exploration activities cause little, if any, environmental disturbances and they are not incompatible with wildlife in the area and specifically, elk and dear. Without detailed exploration information, it would not be possible to define the resource and develop plans of operation. Development could not proceed without this crucial information.

Page Col. Para.

38-76 (cont.)

These mitigation measures are too stringent and serve to unnecessarily limit development at a cost which is not commensurate with the provided benefits. Also, they are premature since it is stated in the DEIS that some of these protected deer and elk habitat uses are not yet known to occur in the STSA, i.e., deer fawning areas (DEIS pp. 3-33 and A-4-2). More reasonable protection could be provided to deer and elk without excluding exploration.

38-77

4-3 1 5 Monitoring would be one of the mechanisms for assuring regulatory compliance of tar sand development. The worst-case impact analysis assumes that, for example, the Utah Department of Health (Bureau of Air Quality and Bureau of Water Pollution) would allow violations or exceedence of air and water quality standards. Obviously this would not be the case and to predict these violations is being unrealistic. The impact analysis has to assume environmental controls and mitigation and regulatory compliance.

4-3 2 3

Page Col. Para.

38-78

The BLM should add that the list monitoring programs given in Table 4-1 is necessarily incomplete and only a partial listing of the programs that would be required. Specific baseline and impact monitoring programs cannot be developed until additional resource information is obtained and project planning moves beyond the conceptual stages. Nevertheless, applicants are doing more than is indicated in Table 4-1. For example, Amoco has completed two comprehensive environmental baseline studies for the STSA and areas involved in its proposed water supply system. Amoco has also prepared a hydrology monitoring program for the STSA, regulatory reviews, and permitting strategies as well as specific laboratory studies relating to waste sand disposal.

38-79

4-5 2 6
4-6 1 7

The rationale for these two mitigation measures is not clear. These two paragraphs state the two mitigation measures would be enforced for only one year. What would that do? The two paragraphs imply that the total lease areas would be disturbed at the same time which is not the case. The BLM needs to clarify the justification for the

Page Col. Para.

38-79 (cont.)

mitigation measures and to insure that this justification is reasonable.

38-80

4-6 2 2

These comments stating that projects would not be allowed to operate in violation of existing tar environmental laws and regulations should be used throughout the DEIS wherever air quality and water quality standards are predicted to be exceeded. The worst-case analysis should be modified by these and other environmental controls and mitigation measures.

38-81

4-6 2 3

The BLM should also assume that as yet undetermined wildlife programs would mitigate somewhat the long-term adverse trends and in the case of off-site wildlife habitat enhancement programs, improve wildlife conditions in some areas.

38-82

A-2-3 Table A-2-3

Socioeconomics. Construction and operation employment estimates are reversed in Table A-2-3. Construction and operation personnel estimates should be 2,465 and 475 people, respectively.

Page Col. Para.

38-83 Wildlife. Areas in which big game species would be displaced should be 3,150 acres (amount of land disturbed at any one time) and not 12,082 acres as given in Table A-2-3. Out of the total disturbed acreages of 12,082 acres, 8,932 acres would be in various stages of reclamation and revegetation. It is reasonable to assume that vegetation would be sufficiently established and developed to provide wildlife habitat on a ever increasing percentage of this area. Therefore, big game and other wildlife species would not be displaced from 12,082 acres. They would be displaced at any one time from 3,150 acres plus some percentage of 8,932 acres. Table A-2-3 should be changed accordingly.

Air Quality. Based on our review of the air quality technical report (Aerocomp 1983) we think that these air emissions are in error. Our review comments of the technical review are included in our review of this DEIS.

38-84a Agriculture. A total of 180 AUM amounts that 45 cows using the allotment for the four month annual grazing season. The number of cows should be included on Table A-2-3.

Page	Col.	Para.	
38-84b A-6-3	2	2	Tables 4.20 and 4.21 are missing from the socioeconomic technical report.

REVIEW OF SUNNYSIDE COMBINED
HYDROCARBON LEASE CONVERSION
AIR QUALITY TECHNICAL REPORT

NOVEMBER, 1983

REVIEW PREPARED BY STANDARD OIL COMPANY (INDIANA)
JANUARY 10, 1984

A review has been conducted of the Air Quality Technical Report for the Sunnyside Combined Hydrocarbon Lease Conversion prepared by Aerocomp dated November, 1983. As a result of this review, Amoco feels very strongly that the conclusions reached in this report are inaccurate, speculative in nature, and will not reflect the air quality consequences of the resource development. We believe that the conclusions which have been reached are in error because of flawed or inappropriate air quality analysis techniques and inaccurate emission inventory data. One basic premise which was overlooked throughout this analysis is that existing environmental regulations will not permit deterioration of air quality to the levels projected in this report (this is assuming that the projections made in this report are reasonable which, in our opinion, they are not). Thus, resource development would be curtailed prior to air quality being allowed to deteriorate to the levels projected.

As a result of the serious deficiencies found in the Air Quality Technical Report, the air quality analysis presented in the Draft Environmental Impact Statement for the Sunnyside Combined Hydrocarbon Lease Conversion is also seriously flawed and inaccurate.

It is very important to ensure that initial resource development is not overly restricted as a result of an inaccurate projection of the air quality. Thus, we think that this report and the Draft EIS for the Sunnyside Combined Hydrocarbon Lease Conversion must be corrected to reflect our comments.

Our specific comments are presented by page number. Our comments are presented in the following order: Section 3.1 Emission Methodology; then Section 3.2 Dispersion Modeling Methodology, and lastly Section 2 Environmental Consequences of the Proposed Action. Comments are presented in this order to illustrate how seriously flawed the foundation of this analysis is.

In order to correct the problems which we have identified, we think that much of this work will need to be redone. We further think that unless a realistic analysis is performed, resource development could be unnecessarily restricted.

The following presents Amoco's comments on Section 3.1 Emission Inventory Methodology. It is our opinion that this section requires substantial improvement and clarification. Because the development of an emission inventory is the foundation for all air quality analysis, there is a need for accurate inventories. Unless substantial improvements and clarifications are made to this inventory, the conclusions reached regarding tar sands resource development will be meaningless.

In preparing these comments, we have only addressed what we think are deficiencies in methodologies of emission inventory development as they pertain to Amoco sources. However, this does not mean we feel that the emission data developed for other projects is a realistic representation of what emissions would be.

	Page	Column	Para.	
38-85	83			We think that controls beyond New Source Performance Standards (NSPS) should not be suggested or implied as typical for all sources at this early stage of development. For example, hydrocarbon emissions from tanks need not be controlled with vapor recovery.
38-86	85			Section 3.1.2--A general caveat should be added to this section which states that these emission estimates are highly speculative, as a result of the uncertainty in specific project description. As projects become better defined, the accuracy in the emission estimates will improve. A large uncertainty occurs in the estimates of fugitive dust emissions. These estimates have been extrapolated from materials which are very different from those which will be employed in these projects and hence, probably do not reflect representative emissions.
38-87	86		2	We think that the documentation provided to support the emission inventory development is insufficient and incomplete. It is imperative that detailed information be provided on what

Page Column Para.

38-88 assumptions were used and exactly how each emission inventory was developed (for each pollutant) for each project. This is a serious deficiency in this report. As the report is written, it is impossible to reproduce or confirm the emission estimates which have heen developed. Specifically, one should be able to examine the total emissions listed in Table 3.1-3 and determine which source types contribute to the total emissions listed for Amoco's plant, mine, and spent tar sands categories. In many cases, the emission estimates appear to be unrealistically high. However, it is impossible based on the data presented to confirm or reject these estimates.

38-89 87 Table 3.1-1, Emission Factors Used for Vehicle Exhaust Emissions Calculations--We question the emission factor of 3.16 g/mile for Other Gasoline Vehicles for particulate matter. AP-42 references 0.34 g/mile for the tailpipe exhaust and 0.20 g/mile for tire wear. If the emission estimate derived by Aerocomp is a result of re-entrained road dust, it should be stated as such, otherwise documentation should be provided on why such a

Page Column Para.

38-89 (cont.) high emission factor was used. There also appears to be an inconsistency in emission estimates between the Access Road Vehicles and Other Gasoline Vehicles categories. First, what fuel was assumed for Access Road Vehicles? Second, why is there such a large difference between SO_x, CO, and TSP emission factors between these two categories? For example, there is more than an order of magnitude difference in SO_x emission factors between these two source categories. Similarly, there is a four-fold difference in CO emission factors and a two-fold difference in particulate matter emission factors.

We also think that hydrocarbon emission factors should be added to this table.

38-90 88 Table 3.1-2, Fugitive Dust Emission Factors, Control Strategies, and Control Efficiencies--We think that the assumptions used to develop the emission estimates should be identified. For example, what are the climatic conditions used in developing the emission estimate for wind erosion? The data presented by the State of Colorado for climatic conditions (Aerocomp's reference) is not

Page Column Para.

38-90 (cont.)

complete for the Sunnyside project area. We have similar concerns regarding the assumptions used to develop other emission estimates. The State of Colorado has recently revised their emission factors for batch dumping (August, 1983). Incorporation of these revised emission factors would greatly reduce emission estimates for overburden dumping and tar sands dumping.

Aerocomp assumed a control efficiency of 80 percent for tar sands dumping and 70 percent for tar sand paved roads. How were these numbers arrived at?

We also think that wind erosion may be controlled by using proper mining techniques and through revegetation. The State of Colorado has indicated that a 75 percent control efficiency may be obtained through revegetation, yet this table states that no controls will be applied. This, however, will not be the case.

38-91 90

Tahle 3.1-3, Emission Inventory--Cumulative Proposed Action--The data presented in this tahle is submitted without any support on how emission

Page Column Para.

38-91 (cont.)

estimates were developed for each company. Enough detail should he provided in the text or in additional tahles to use the emission factor information and understand how the projected emissions were arrived at. This is simply not possible as the data is presented. In some cases, it is apparent that emission estimates were simply scaled up from emission estimates for Mono Power. In other cases, there is no rationale on how the emission estimates were arrived at. For example, particulate emissions from the Amoco extraction plant are simply scaled up from Mono estimates, however, emissions from the Amoco mine are approximately 133 percent more than the scaled-up emissions from the Mono Power project. However, no rationale or justification is provided for the large increase in particulate emissions from the Amoco mine.

38-92

Amoco has submitted emission estimates for its processing plant (50,000 BPD capacity) to BLM. It has been determined that the hoilers would be the major sources of emission. These are estimated to he between 1,600 to 10,000 tons per year SO_2, 125-1,000 tons per year particulate matter, and

308

Page Column Para.

38-92 (cont.)

1,300-2,900 tons per year NO_x. These estimates are very different from the estimates made by Aerocomp. For example, Aerocomp estimated NO_x emissions to be 436 percent greater than those developed by Amoco. In Amoco's opinion, the SO_x estimates for the mine (836 tons per year) and spent tar sands process (115 tons per year) for the Amoco plant appear unrealistically high. Since no justification is provided for these estimates, we cannot critique them other than by intuition.

38-93

The table incorrectly describes Amoco's extraction process. It is not a hot water extraction but may be either solvent extraction or a retorting process.

38-94 91 & 92

Tables 3.1-4 and 3.1-5--The same comments developed for Table 3.1-3 apply to these tables.

38-95

Table 3.1-7--County-Wide Emissions--For the scenario of No Federal Action in Carbon County, it is estimated that particulate emissions will increase by 125 percent in the year 2005. Data should be presented to substantiate this projected

Page Column Para.

38-95 (cont.)

increase (i.e., what source types will account for such a large increase). Similarly, CO emissions are projected to decrease in both Carbon and Emery counties. VOC emissions are also projected to decrease in Emery County. Backup documentation should also be provided for these projected changes in CO and VOC emissions.

38-96 98

We think that the population estimates for the year 2005 should be provided and referenced.

The following presents Amoco's comments pertaining to Section 3.2, Dispersion Modeling Methbdology. In general, we think that many of the modeling techniques which were employed in this analysis are either unrealistic and do not provide a reasonable projection of anticipated air quality or are technically incorrect. What Aerocomp appeared to do was to execute the model and present the results without analyzing if the results were reasonable or not.

38-97 101

Third Bullet--We disagree that Valley has been validated by EPA. This model has been compared to monitor data but has not been validated.

Page Column Para.

38-98

101 3 In justifying the use of the Valley model, Aerocomp has neglected EPA's guidance on the use of this model. This policy states the Valley model should be used as a "first level screening analysis." If a violation of any NAAQS or controlling PSD increment is indicated, then a second-level screening technique or a more refined analysis technique should be applied. It is important to remember why EPA has established this protocol. In developing modeling guidelines, EPA recognized thet a screening technique, such as the Valley model, is very conservative in nature. Such techniques were developed to provide a quick and efficient method of determining if a source might jeopardize an NAAQS or a PSD increment. If this is not the case, then there would be no need to use a more refined modeling technique to predict source impacts. Conversely, if tbe screening technique indicates a possible violation of an NAAQS or PSD increment, then emission limits should not be based solely on an overly conservative screening technique and, hence, a more refined analysis should be conducted. This second-level analysis would use actual on-site meteorological dete as opposed to an assumed or

Page Column Pera.

hypothetical 2.5 m/s wind speed coupled with Class D or F stability, and a constant wind direction occurring for a period of six hours in a 24-hour period. To state that Valley with its assumed meteorological conditions is as good as, if not better than, e sequential model (using ectual, not assumed meteorological conditions) is not justified. We concur tbat data do not presently exist to execute a more sopbisticated analysis, however, the projections made using Valley need to be improved and put into a proper perspective with respect to the accurecy of the predictions.

38-99

102 1 The comparison between the Valley model and the CDM model is not relevant. The CDM model was developed as an urban model and should not be applied to a rural environment, such as Sunnyside.

38-100

103 3 Estimation of TSP concentrations for area sources using the BU422 model is inappropriate. While EPA recognizes linear extrapolation as an appropriate screening technique, extrapolation of the emission increases in the magnitude suggested here is not justified.

38-101

Page Column Para.

38-101 (cont.)

We think that linear extrapolation is inappropriate since it assumes that the projected source/receptor relationship will he the same as the current relationship between existing sources and monitors. For the case of mine development, the assumption that this relationship will remain constant is not valid. Secondly, the manner in which particulates may he released to the atmosphere may he very different than the method in which current area source emissions are released to the atmosphere. For example, particulate matter released at the bottom of an open pit mine will have substantially less impact on amhient air quality than particulate matter currently emitted at ground level. A simple linear extrapolation model, however, would ignore these differences in the manner in which particulate matter is released into the atmosphere. A third prohlem with this type of extrapolation is that the spatial resolution of the TSP concentration estimates is extremely poor. For example, TSP concentration estimates as a result of mine development for a 60 x 40 km area appear to have been projected on the hasis of 15 hi vol monitors. Using this type of technique, it

Page Column Para.

38-101 (cont.)

is impossihle to develop accurate or precise impacts from area sources.

38-102

104 3 It is not clear when the Mesopuff model was used and exactly for what purposes. The major point of uncertainty is that the term regional is not defined. Does this imply a distance greater than 50 km?

38-103

We disagree that the Mesopuff model is a Guideline Model. EPA considers this model as an Alternative Air Quality Model, not a Guideline Model.

38-104

106 Tahle 3.2-2, Model Use Matrix--No information is provided in this report of the emission inventory Model BU420 which is referenced in this tahle. A complete description of the model and its application should he provided.

38-105

107 Section 3.2.2.1, Valley Model--Based on the information presented in the Technical Report, it is impossihle to determine exactly how the Valley model was used to project air quality levels (for SO_2, NO_2, and TSP) in Section 2 of the report. For example, how were the impacts of various

311

Page	Column	Para.	

38-105 (cont.)

plants summed to provide concentration estimates for both short-term and long-term estimates. Similarly, how were area source impacts added to determine total impacts for long-term and short-term time periods. Since the Valley model does not provide three-hour concentration estimates, it is impossible to determine how three-hour SO_2 concentration estimates were made.

38-106

It is not stated how the terrain elevations were determined for model input.

38-107

Because of the large impacts projected for total suspended particulates, it would have been advisable to incorporate a deposition algorithm into the Valley model. It is Amoco's opinion that this change in the Valley model would have improved the accuracy of the predicted particulate concentrations. This type of modeling technique has been used in the State of Colorado in support of PSD permits. Apparently, a half life of 72 hours was used to simulate particle deposition. This modeling technique, however, is not recommended by EPA.

Page	Column	Para.	

38-108

It is not stated if the annual TSP concentrations are an annual arithmetic mean (as computed by the model) or an annual geometric mean (as the NAAQS is expressed). If the concentrations are a geometric mean, a discussion should be provided on how the transformation from an arithmetic mean was made.

38-109

For NO_x, the use of pollutant half life to simulate the conversion of NO into NO_2 is technically incorrect. Similarly, the assumption that all NO_x emissions are emitted as NO_2 is also not appropriate. Since violations of the NO_2 annual NAAQS are projected, a more refined NO_2 analysis technique, such as the ozone limiting method, should have been used to project NO_2 impacts.

38-110

Page	Column	Para.	
109			Section 3.2.2.2, Mesopuff--It is not clear what short-term regional impacts were determined with the Mesopuff model.

38-111

Page	Column	Para.	
113		2	A more detailed description of the plume trajectory, associated meteorology, and frequency of occurrence assumed for the RPM II analysis should be provided.

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38-112

113

Section 3.2.2.5, BU422, Area Emissions--Based on the information provided in this section, it is not possible to understand which monitor data were (referenced in Table 2.1-2) used in the regression analysis. It is also impossible to determine the emission rates used in the regression analysis. For the graphs presented, it is not clear if the annual geometric mean or the arithmetic mean is being used for the annual analysis. Similarly, for the short-term analyses, it is not clear if the highest, second highest, or other measured 24-hour concentration is being used for the 24-hour analysis.

38-113

It is also very unclear how this analysis technique can be applied to such a large area and provide any reasonably accurate means of portraying spatial TSP concentrations.

38-114

123

Table 3.2-5, Emission Input for Valley Modeling Analysis--It is not stated how the physical stack parameters listed in this table were arrived at. Such documentation should be provided. As previously stated, we think that simulating fugitive dust impacts using the BU422 model is

Page Column Para.

38-114 (cont.)

inappropriate. Some explanation between the difference in the annual emission rate and the short-term emission rate should be provided.

38-115

121

Section 3.3.3.4, Summary of Modeling Assumptions--No justification has been provided on why an area source width of two km and a release height of three meters was used in the Mesopuff and Valley modeling.

38-116

For the Valley modeling, it is not clear for which pollutants a 72-hour half life was assumed. We think and concur with EPA that use of a half life to simulate particulate deposition and the conversion of NO into NO_2 is not appropriate. For SO_2, some justification for a 72-hour half life should be provided. The 1980 EPA proposed revisions to the Modeling Guidelines suggest a half life of 16 hours for distances greater than 50 km.

The following present our comments for Section 2 entitled Environmental Consequences of the Proposed Action and Alternatives. In this review, we have focused almost exclusively on projected

Page Column Para.

impacts from tha Amoco project. However, we think that impacts from other projects are not accurate.

38-117

16 — Table 2.1-2, Ambient Particulate Concentrations--The table should he ratitled Ambient Total Suspended Particulate Concentrations. The second highest 24-hour data are not presanted for the Sand Wash 1980, White River 1975 and 1976. An annual geometric mean was calculated, however, which indicates a relatively complete data hase. If the data exist, they should he presented.

38-118

24 — Table 2.1-6, Utah, Colorado, National Amhient Air Quality Standards--The reference to annual total suspended particulate matter standards should indicate that the standard is an annual geometric mean.

38-119

27 — 1 — First Complete Paragraph--Once tha first PSD permit is suhmitted, it will not he necessary for the State of Utah to ensure that the combined hydrocarbon developmants would not cause or contribute to a violation of PSD increments. This process will be completed as requests for

Page Column Para.

38-119 (cont.)

additional resource development ara submitted as part of tha PSD review process. If during this review process it is discovered that excursions of the PSD Class 1 or Class 11 increment may occur, then additional controls, or changes in plant design, would be necessary. If additional controls are necessary, they should be developed by the permittee and not dictated hy the control agency.

38-120

30 — 1 — Continuation of Paragraph from Page 29--The conclusion reached regarding Amoco surface mine particulate matter emissions in relationship to the NAAQS for TSP is unfounded. First, the emissions of particulate matter from the Amoco mine are highly speculative and uncertain. Secondly, development would not he permitted to occur to tha point where excursions of the NAAQS or PSD Class 11 increment would occur.

38-121

30 — 2 — We disagree that "known mitigation maasures could significantly decrease the extent of the emissions, but may not completaly prevent the levels from exceeding the standards." Simply stated, resource development will he limited if

Page Column Para.

38-121 (cont.)

projected emissions indicate an excursion of the NAAQS is likely.

38-122

30 4 We think that the NO_2 impacts from stack emissions are overpredicted as a result of improper analysis and unrealistic emission estimates. In addition, we think that the NO_2 impacts for mining activities are overpredicted and, hence, mitigation may not be necessary.

38-123

32 Section 2.1.3.2, Amoco--For Amoco, a baseline projection for the year 2005 estimates a TSP impact of 84 $\mu g/m^3$ for a 24-hour average and 24 $\mu g/m^3$ for an annual average. It is interesting to note that this is the same baseline impact for the year 2005 which was projected for the Mono Power and Sabine projects. Identical TSP impacts in the vicinity of these three projects are very unlikely. This illustrates the lack of spatial resolution provided by using an extrapolation method to estimate TSP concentrations for area sources and how inaccurate the projected TSP concentrations are.

Page Column Para.

38-124

When annual concentrations are discussed for TSP, it is not clear if these annual concentrations are a geometric mean or an arithmetic mean. For the 170 $\mu g/m^3$ projected annual impact from Amoco sources, some type of culpability analysis should be provided in order to identify which sources are responsible for the projected impact.

38-125

Based on Aerocomp's analysis, they project excursions of TSP and NO_2 NAAQS. Similarly, they project PSD increment excursions for SO_2 and TSP, however, these estimates are based only on a simple screening analysis which in some cases use a hypothetical set of meteorological conditions. The analysis does not realistically treat particle deposition or the conversion of NO into NO_2. Lastly, these estimates are based on emission inventories which are very inaccurate.

38-126

In the third paragraph on page 32, it is stated that "such large impacts cannot be mitigated." If these projected impacts were accurate (and we don't believe they are), then resource development would not be allowed to continue beyond the controlling NAAQS or PSD increment. This point

Page Column Para.

38-127 has been overlooked throughout this report. However, it is premature to discuss mitigation measures until accurate projections of ambient air quality as a result of resource development are made.

38-128 33 Table 2.1-9, Summary of PSD Increment Consumption for Each Alternative--In this table, it is not clear if the highest or the second highest concentration is listed for comparison with the short-term increments. Similarly, for TSP annual, is this an arithmetic average or a geometric mean concentration?

38-129 34 Table 2.1-10, Comparison of Maximum Site Specific Impacts with NAAQS, Amoco--The term maximum concentration should not be applied to annual concentration estimates. Annual TSP concentration should be referenced as a geometric mean. From the material presented in Section 3.2, it is not clear how the maximum 24-hour concentration listed in this table was calculated. Since the Valley model estimates the second highest 24-hour concentration, how was the highest predicted concentration arrived at? Section 3.2 also does

Page Column Para.

38-129 (cont.) not discuss the methodology used to calculate the maximum three-hour concentration. The Valley model cannot be used directly to produce this estimate.

38-130 Comparison of annual TSP impacts for Amoco and Mono Power indicates a 126 $\mu g/m^3$ difference between predicted impacts. The capacity of the Mono Power project is only 40 percent less than that of Amoco, however, there are massive differences in predicted concentrations. Some clarification must be provided.

38-131 53 1 We are not certain that an oxidant photolysis rate measured in the Los Angeles urban environment is applicable to a rural environment, such as Sunnyside.

38-132 54 1 If the assumption of equal distribution of major hydrocarbon distribution is changed, what result will this have on predicted concentrations?

38-133 54 2 The assumption of all hydrocarbon emissions being emitted from a single point source is overly restrictive.

Page	Column	Para.	
56		1	NO_2 is more likely to be a pracursor of acidic deposition than NO_x ($NO + NO_2$). Tha assumption that "all nitrogen compounds were assumed to be NO_x" is not reasonable. Similarly, "the settling of velocity of NO_x ..." is not tachnically correct.

38-134

We think that the annual deposition rates calculated are overly conservative. The frequency of occurrence of the worst case meteorology must be used to determine the annual average deposition rate, not simply the wind direction frequency distribution. By assuming the annual deposition rate based solely on wind direction frequency assumes that every time a wind diracta a plume from the Sunnyside development towards a sensitive receptor that the other meteorological parameter controlling deposition (such as wind speed and atmospheric stability) are identical to the assumed worst 24-hour period. This is not a reasonable assumption.

38-135

RESPONSES TO COMMENT LETTER 38

To avoid duplication, none of the comments expressed in the cover letter and introduction to Comment Letter 38 are answered because tbese comments are repeated in tbe formal comment attachments.

38-1 Although no commitments for unitization have been signed, a unitized development alternative was discussed and analyzed in Sections 1.E. and 3.C.

38-2, 38-3 See response to comments 33-18 and 33-19.

38-4 Tbe Summary cannot contain all existing regulations and laws because its purpose is to present a short, concise synopsis of the projects and impact analysis. Detailed discussions of laws and regulations are presented elsewbere in the document.

38-5 "Would" has been cbanged to "could" in Section 1.A. Introduction. We agree with your definitions of "would" and "could" but believe that the uses of these words are generally correctly stated and supported by the analysis in the EIS.

38-6 See response to comment 33-2.

38-7 The references have been changed to Tables 1-9, 1-10, and 1-11.

38-8, 38-9, 38-10 Section 1.C.2, Applicants' Plans of Operations, bas been corrected.

38-11 The paragraph in Section 1.C.2, Applicants' Plans of Operations, has been reworded to include the added information.

38-12 See response to comment 33-19.

38-13 See response to comment 32-2.

38-14 The paragraph states tbe basic assumption for this alternative: <u>no</u> tar sand development would occur on federal land because, <u>if</u> lease conversion is disallowed because of environmental impacts, the same environmental impacts would likely result in no new leases being offered. The new leasing program is discussed in tbe Utab Combined Hydrocarbon Leasing Regional Final EIS (BLM 1984).

Because all applicant plans of operations are highly conceptual, the EIS had to analyze tbe worst case, which this document defines as total surface disturbance of areas considered for conversion. (See tbe analysis assumptions discussion in Section 1.C.2, Applicants' Plans of Operations.)

Tbe EIS analysis, however, resulted in BLM's preferred alternative not being the no action alternative but conversion of all leases under unitized development.

38-15 As stated, Amoco could elect to develop tar sand on private land, but no firm plans have been presented.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-16 Data sheets submitted by Standard Oil (March 24, 1983) gave a range from 300,000 to 600,000 tons mined per day. When a range is given the high number is used. Thus, a daily total of 600,000 tons would amount to a yearly total of 105 million tons. A daily total of 300,000 tons would amount to a yearly total of 54 million tons.

38-17 The two projects are not the same. Water use shown in Table 1-7 is correct. Chevron interrelated projects are described in Section 1.A.5, Interrelationships, and Chevron's lease conversion project is described in Section 1.C.2, Applicants' Plans of Operations.

38-18 Total production under unitized development should be 2.8 billion barrels--the same as the cumulative total for the proposed actions. The text has been corrected in Section 2.B (2.C in final EIS), Unitized Development.

The total area disturbed would be the same 38,845 acres under the proposed actions cumulative scenario and under unitized development. Impacts listed in Table 2-1 are in fact less. See acres disturbed at one time 6,500 versus 3,500; water use; socioeconomics; and soils and vegetation.

38-19 Figure 2-1 has been corrected.

38-20 The stipulations are part of the Price River Resource Area Management Framework Plan (1983g) and are required for all drilling in the resource area. The stipulations may be changed as deemed needed by the authorized officer.

38-21 The reference to Section 1.D.2 has been corrected to read 1.C.2.

38-22 See Chapter 3, Introduction, for a discussion of impact analysis assumptions.

38-23 The significance criterion is used as a standard to judge significance or insignificance. Whatever violation may or may not occur is addressed later in Chapter 3 under Impacts.

38-24 Paragraph 1, column 1 on page 1 of the draft EIS has been deleted.

38-25 The analysis referred to speaks to potential impacts. If existing regulations are not violated, impacts would not be significant.

38-26 The sentence in the discussion of the water quality of Grassy Trail Creek watershed (Section 3.A.1, Water Resources) has been revised.

38-27 Your clarification has been included in Section 3.A.1, Water Resources, of this final EIS.

38-28 Table 3-2 has been revised.

38-29 The subject of required regulatory measures has been addressed in Chapter 3 of the final EIS.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-30 See the note on Table 1-7, which states that Range Creek is not a practical water source.

38-31 If baseflows and water quality are maintained, no impact would occur. The text in Section 3.A.1, Water Resources, has been changed to state that the impact could occur.

38-32, 38-33, 38-34 This statement in Section 3.A.1, Water Resources, has been deleted.

38-35 Table 3-4 has been changed accordingly. You are correct--absence of flow cannot show a water quality change. The analysis assumed that Enercor would use the total predicted flow of Range Creek.

38-36 The Draft Socioeconomic Technical Report (Argonne National Laboratory 1983) was designed to present and evaluate the potential impacts from development of the proposed tar sand projects in the STSA. The report contains descriptive analyses of the baseline conditions, scenario impacts, interrelated project impacts, and cumulative effects. According to the work scope, the intent of this report was to provide the analyses needed to draw conclusions and summarize impacts in the draft and final EISs. The report fulfills this objective. Also see response to comment 33-75.

38-37 Because most socioeconomic impacts result from increased population, the population estimate is a basic element of an impact analysis. Impacts that are not explicitly covered in the EIS can still be estimated if the population figures are provided.

The 5 percent significance criterion is a standard required by the State of Utah under Utah Code Annotated Section 63-51-10 (Supp. 1981).

38-38, 38-39 Item (2)--poisonous and noxious weeds would invade and occupy more than 5 percent of a specific vegetation type where none existed previously--is a part of the vegetation impact significance criteria. The complete impact signifiance criteria are used for impact analysis. Poisonous and noxious plants would not be a significant impact in this project and therefore were not mentioned.

38-40 The establishing of ground cover (mostly grasses) would provide habitat for some wildlife. Habitat for small mammals exists, but valued habitat for mule deer may not exist. The 25 percent disturbance is based upon all habitats, not just climax habitats.

38-41 Because all applicant plans of operations are highly conceptual, the EIS had to analyze the worst case, which this document defines as total surface disturbance of areas considered for conversion. (See the analysis assumptions discussion in Section 1.C.2, Applicants' Plans of Operations.)

RESPONSES TO COMMENT LETTER 38 (Continued)

38-42 According to Utah Division of Wildlife Resources personnel (Dalton 1983), fawning does occur in the STSA, but the exact locations are unknown. Therefore, mitigation measure 9 (measure 8 in the final EIS) is needed until the fawning areas are identified as proposed in Appendix A-4.

38-43 Reclaimed habitat will not return to preconstruction deer carrying capacity (vegetation types used by mule deer) for nearly 100 years. Therefore, it appears reasonable that the 11 percent reduction in the deer herd could cause a corresponding reduction in license income over the short term.

38-44 Vegetation succession in reclaimed areas would not return the area to preconstruction composition for nearly 100 years. Some wildlife species could use habitats developed during the period from initial seeding to final preconstruction production. The original species, however, would return at a much slower rate. Unless the habitat actually returns to preconstruction structure, original species might never return. (See Section 3.A.4, Wildlife, for this discussion.) We have made a worst-case assumption.

38-45 The removal of streamside vegetation and release of water from settling ponds would harm downstream fisheries by increasing stream temperatures to levels intolerable to cold water fish.

38-46 According to the Endangered Species Act of 1973, as amended, any impact to listed species is considered significant. Final estimates of total impacts and mitigation measures must wait until the biological assessment and biological opinion are completed. The paragraph in Section 3.A.4, Wildlife, however, has been clarified.

38-47 The text is not intended to encourage trespassing on privately owned surface property; nor does the text segregate private from public lands at the Bruin Point View Area. Instead, the text factually reports recreation uses in this area.

38-48 Your concerns are addressed below by topic. Also see Chapter 3 for a discussion of impact analysis assumptions.

Emission Inventory

Although BLM gave lease conversion applicants ample opportunity to supply emission inventories, only Mono Power Company responded with a detailed plan of operations. Amoco reported that the emission inventory from its proposed mine in the Sunnyside STSA was unknown at that time and provided too large a range in emission estimates from its commercial plant to be helpful. For instance, the SO_2 emission estimate ranged from 1,600 to 10,000 tons per year (TPY), NO_2 ranged from 1,300 to 2,900 TPY, hydrocarbons ranged from 0 to 7,000 TPY, and the particulate emissions ranged from 125 to 1,000 TPY. Additionally, these estimates were provided without documentation. In the absence of applicant support, BLM had to compile a realistic emission inventory for the impact assessment.

38-48 Cont. The emission rates are indeed uncertain. Considering the uncertainties of facility types, location, and emissions, BLM adopted a conservative approach. Moreover, the fugitive dust estimates agree favorably with those of Mono Power for the proposed 30,000 barrels per day (bbl/day) commercial project (Mono Power Company Plan of Operations, revised April 19, 1983). Mono Power estimated 5,759 TPY of controlled particulate emissions from its commercial mine; our calculation shows 5,612 TPY--a difference of less than 5 percent.

Modeling Methodology

Conservative screening models were used because of a lack of detailed emission data and site-specific meteorology data. Sophisticated models will not correct deficiencies in the emission inventories or the absence of meteorological data near the site. Refined models for complex terrain, such as COMPLEX I and II, require on-site meteorological data. Of the five applicants, only Chevron had collected such data, and this data set was incomplete because it encompassed only 10 months. Thus the use of refined dispersion models was not possible.

Impact Assessment

As noted in the technical report, applying the suggested mitigation measures could result in no residual SO_2 and NO_2 impacts for the high and low production scenarios, but residual TSP impacts are expected to remain.

The size and extent of the TSP impacts are not surprising when considering the scope of the projected mining. For the life of the development, over 4 billion tons of tar sand would be processed under the proposed actions in a 400 square kilometer area. By comparison, planned surface coal development in the Uinta-Southwestern Utah coal region (Rounds 1 and 2) would approach only 65 million tons but would be spread over several counties in Utah. Amoco proposes mining 105 million TPY of tar sand in the Sunnyside STSA, which is more than an order of magnitude larger than the largest surface coal mines in the United States. Thus we feel that the significant TSP impacts are not surprising and, in fact, seem reasonable.

38-49 Your comment is accurate. For the final EIS, Table 3-16 has been changed to show that the annual TSP standard is an annual geometric mean and that the annual SO_2 and NO_2 standards are annual arithmetic means. The table already shows that the hydrocarbon significance criterion is no longer a national standard (see footnotes).

38-50 Map 3-6 represents annual geometric mean TSP concentrations because most of the impacts result from surface mining. The area source impacts were simulated by a regression technique using monitored air quality data.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-50 Cont. See Table 2.1-2 of the Air Quality Technical Report (Aerocomp Inc. 1983). Monitors in remote locations, such as Sand Wash and U-a and U-b White River, show background TSP concentrations ranging from 15 to 25 ug/m^3. Also a background value of 19 ug/m^3 was computed by BU422, an empirical model for estimating TSP ambient concentrations from emission densities. Therefore the use of 20 ug/m^3 was felt to be reasonable.

38-51 Projected annual SO_2 and NO_2 concentrations are arithmetic means, whereas predicted annual TSP concentrations are geometric means.

Also see response to comment 38-48.

38-52 The intent of this study was not to determine the production level that meets the NAAQS or PSD increments but to determine impacts from facilities suggested by the lease applicants.

The comparison to the city of Price was to show the size of the proposed tar sand mining operation.

38-53 See response to comment 38-48.

38-54 It is indeed conservative to treat all nitorgen compounds as NO_2, but this assumption is often made in air quality analyses as in the Uintah Basin Synfuels Development EIS (BLM 1983f). It is logical and consistent to extend this assumption to the acid deposition analysis.

You are correct in that the settling velocity of NO_x is not technically correct. All references to NO_x settling velocities have been changed to NO_2 settling velocities for the final EIS.

Also see response to comment 38-48.

Table 3-20 and the text in Section 3.A.7, Air Quality, have been revised.

38-55 The paragraph should have read "long-term transportation impacts" instead of "land use." Without knowledge of the specific location of the speed-loading facilities and the rail car storage yard to the road crossings, impacts are difficult to assess. The movement of the 2.5 unit trains and the locating and storing of the 210 tank cars could impede traffic flow at the railroad crossings for the life of the project. Moreover, this stopping of traffic and storing of railroad cars could cause unstable traffic flow and might increase traffic accidents for the life of the project.

38-56 The text in Section 3.A.8, Transportation Networks, Railroad System, has been changed to correct this statement.

38-57 This comment is incorrect. The significance criterion states that impacts to cropland would be considered significant if more than 5 acres (not 5 percent) of land within the STSA is irreversibly converted to other uses. The 5 percent criterion applies to cropland outside the STSA.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-58 See Table 3-25. The cumulative total of forage available per year is 2,059 AUMs. The estimated 387 AUMs of forage lost per year exceeds the 5 percent reduction of forage criterion, which makes this impact significant.

38-59 Comment concern is expressed in the EIS. The degree and size of impact to grazing on each ranch operation or allotment cannot be specifically quantified because of the variables of location, rate, and timing of the proposed mining. See section 3.A.9, Agriculture, Livestock Grazing.

38-60 Table 3-25 shows forage production reductions expressed in AUMs, which are a basic factor in evaluating impacts to grazing. The text discusses livestock stocking rate reductions by number of cattle based on a 4-month grazing period. The column entitled "Percent of Allotment" in Table 3-25 shows that a 13 percent forage reduction would occur in the Dry Canyon allotment, causing a reduction of livestock stocking rates greater than 5 percent. Evaluated under the significance criterion, the impact to grazing in the Dry Canyon allotment would be significant.

38-61 The analysis for determining the potential cropland converted to urban use due to the increased population is discussed in the Section 3.A.9, Agriculture, Cropland. The evaluations are based on the cropland data from the Soil Conservation Service (SCS 1979) and State of Utah, Department of Agriculture (1981) and a conversion factor of 0.13 acres per capita (ERS 1970).

38-62 The analysis of water resources in Section 3.A.12, Wilderness Resources, is based upon the analytical results in Section 3.A.1, Water Resources, Range Creek Watershed. With "appropriate environmental controls and monitoring measures as well as regulatory compliance requirements," water resource effects in the Range Creek watershed would be slight. But the water temperature of Range Creek could increase, harming the trout fishery and altering the naturalness of both WSAs.

38-63 Table 3-26 refers to Nine Mile Creek <u>watershed</u>, not Nine Mile Creek.

38-64 Total dissolved solid values for the Green River have been changed to less than 1 milligram per liter in Table 3-27.

38-65 See response to comment 38-48.

Fugitive dust control methods that apply to tar sand development are listed in Table 2-1 of the Air Quality Technical Report (Aerocomp Inc. 1983).

38-66 See response to comment 38-48.

Also see Section 2 of the Air Quality Technical Report (Aerocomp Inc. 1983) for a complete discussion of mitigating measures.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-67 See response to comment 38-48.

38-68 The EIS does discuss rail and pipeline transportation entirely on the basis of production levels. The reason for not examining shipping costs is the lack of specific baseline data. In addition, the shipping costs can be addressed with more accuracy when the applicants apply for a pipeline right-of-way to carry a specific volume to a specific market during a specific time period.

38-69 Rivers are surface water.

38-70 See response to comment 38-48.

38-71 The text in Section 4.A, Site-Specific Mitigation, has been revised.

38-72, 38-73 "Complete" has been changed to "adequate" in Section 4.A, Site-Specific Mitigation, Measure 3 (Measure 2 in Final EIS).

38-74 The statement in Section 4.A, Site-Specific Mitigation, has been revised in the final EIS.

38-75 See response to comments 33-129 and 33-130.

38-76 The measures could be modified by the authorized officer when applications are submitted for exploration, drilling, and other development.

38-77 See Chapter 3 for a discussion of impact analysis assumptions.

38-78 Thank you for the additional information. It has been added to the text in Table 4-1.

38-79 If commercially exploitable amounts of tar sand are not found, these measures would serve to protect native wildlife during exploration and could enable the species to remain part of the fauna in the STSA. All lease areas would not be disturbed at the same time. The paragraphs do not say this.

38-80 See response to comment 33-107.

38-81 This EIS addresses the impacts of and proposed mitigation measures for the proposed actions. It cannot address what might be done in the future if such possibilities are not detailed in the plans of operations.

38-82 The revised employment estimates were provided too late to be included in the analysis. The text, however, has been changed in Sections 1.H, Data Summary, and 3.A.2, Socioeconomics, to acknowledge the revised data and to estimate its effect on the analysis results.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-83 Some acreages would be in various stages of disturbance, reclamation, and revegetation. Climax wildlife species would not return until preconstruction production, densities, and diversity are realized.

38-84a The grazing impact summaries are expressed in AUMs of forage lost because (1) AUMs of forage provides a consistent base to evaluate grazing, and (2) use of AUMs of forage is consistent with Table 3-25.

38-84b See response to comment 33-75.

38-85 The mitigating measures discussed in the Air Quality Technical Report (Aerocomp Inc. 1983) are not designed to represent a BACT, RACT, or LAER analysis that may be required during the permit phase. Rather, they examine potential control strategies that appear technically feasible and enforceable in a permit process. The comment on vapor recovery is consistent with this approach.

38-86 Your suggestion is appropriate. A paragraph stating the uncertainties in the emission data has been added to the errata to the draft Air Quality Technical Report.

38-87 Assumptions made and references used are provided in Table 3.1-3 of the Air Quality Technical Report (Aerocomp Inc. 1983) for each of the proposed project's emission inventories.

38-88 The following clarifying paragraph is included in the errata to the Air Quality Technical Report.

> Over 60 percent of the fugitive dust from mining operations results from the removal, hauling, and dumping of the overburden. Overburden processing also accounts for over 40 percent of the SO_x, NO_x, and CO emissions from the commercial mine. Hauling and dumping of tailings account for over 40 percent of the fugitive dust from the spent tar sand area. Virtually all the SO_x, NO_x, and CO emissions from the spent tar sand area also result from the hauling and dumping of tailings.

38-89 With the exception of access road vehicles, all the emission factors shown in Table 3.1-1 of the Air Quality Technical Report were obtained from Mono Power's Plan of Operations. The source category "other gasoline vehicles" was incorrectly included in the draft technical report but has been corrected in the errata to this report. Thus any discrepancies in the emission factors between these two categories are no longer relevant.

The default vehicle mix for the year 2000 as provided by MOBILE 2 was assumed for the access road vehicles. Eighty percent of the vehicles are expected to be gasoline powered.

As suggested, the hydrocarbon emission factors were added to Table 3.1-1 in the errata to the draft technical report.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-89 Cont. To put this comment in perspective, note that exhaust emissions from access road vehicles contribute less than 1 percent of the total emissions.

38-90 A climatic factor representative of eastern Utah (Armbrust and Woodruff 1968) was assumed. In estimating fugitive dust from wind erosion, the assumptions included a sandy soil type, worst-case conditions for surface roughness, unsheltered field width, and vegetation cover (CAPCD, 1981). In estimating fugitive particulate emissions from dirt roads, the analysis assumed a silt content of 15 percent average vehicle speed of 30 miles per hour, and 290 dry days per year. All the other emission factors in Table 3.1-2 were extracted from the two references listed below the table.

The revised emission factors you mentioned were not assumed in this study because the report was in its final stages in August 1983. Although TSP impacts would be reduced by using the revised factor for batch dumping, significant impacts are still expected.

An emission factor of 0.016 pounds per ton for batch dumping would result from the following assumptions:

- silt content of 7.5 percent
- mean wind speed of 9 miles per hour
- drop height of 5 feet
- moisture content of 1 percent and
- dumping capacity of 10 cubic yards

Since an emission factor of 0.037 pounds per ton was assumed in the technical report, a 43 percent reduction in particulate emissions from dumping operations would result. Dumping accounts for about 20 percent of the particulate emissions. Thus, an overall reduction of almost 10 percent can be expected.

A control efficiency of 80 percent for tar sand dumping was assumed because the oily nature of tar sand acts as a chemical dust suppressant (County of Kern Planning Department 1979.) The control efficiency of 70 percent for tar sand paved roads was obtained from Mono Power's Plan of Operations.

Wind erosion was assumed only from the estimated annual average disturbance plus acreage disturbed throughout the life of the project (for example, land within the commercial facility). Wind erosion of reclaimed land was assumed negligible. BLM estimated disturbed acreage (see Chapter 1 of Sunnyside EIS).

RESPONSES TO COMMENT LETTER 38 (Continued)

38-91 See Table 1-6, which shows that Amoco must mine 133 percent more tar sand than Mono Power per barrel of synfuel recovered. This difference does not represent an inconsistency between these two applicants but rather reflects differences in existing and estimated tar sand resource data, facility design, process technology, operating practices, and engineering philosophy between the two applicants.

38-92 The large range in the emission estimates provided by Amoco rendered them impractical for our dispersion modeling approach. Moreover, the emission estimates were provided with no documentation.

Consultation and coordination were integral parts of the project. Region VIII of the Environmental Protection Agency (EPA), the National Park Service, the Utah Bureau of Air Quality, and the Ute Tribe among others were consulted throughout the analysis. Emission projections were based on industry's best estimate of production, including emission factors from EPA Region VIII, the Department of Energy's Laramie Energy Technology Center, and Lawrence Livermore National Laboratory. Control strategies that appear to be technically feasible and enforceable in a permit process were assumed and were factored into the modeling analysis.

The gaseous emissions from the mining and spent tar sand areas were scaled from Mono Power's Plan of Operations.

38-93 According to our data, Amoco was to use either a hot water or retorting extraction process.

38-94 See responses to comments 38-91, 38-92, and 38-93.

38-95
38-96 Population growth accounts for practically all the particulate emission increase in the No Federal Action scenario up to the year 2005. Demographic data was provided by the socioeconomic analysis. See Section 3.A.2 of the Air Quality Technical Report (Aerocomp Inc. 1983) and the Socioeconomic Technical Report (Argonne National Laboratory 1984).

The CO and VOC emission reductions noted in the No Federal Action scenario would result from projected improved control techniques.

38-97 "Validated in the context given" means comparing modeling results to monitor data. Perhaps "calibrated" would be a better term to use here.

38-98 Uncertainties in the emission inventories and insufficient meteorological data preclude the use of refined air quality models. More modeling will be done later at the PSD stage.

38-99 The conservativeness of VALLEY and its other limitations are discussed in Section 3.2.2.1 of the Air Quality Technical Report (Aerocomp Inc. 1983).

38-100 You are correct. The removal of the comparison between VALLEY and CDM is noted in the errata to the Air Quality Technical Report.

38-101 See response to comment 33-110.

38-102 MESOPUFF was used for the short-term (24 hour) regional (greater than 31 miles) analysis of SO_2 and TSP. It was also used to assess acid deposition impacts because it can simulate the conversion of SO_2 to SO_4 as well as dry and wet deposition.

38-103 The Air Quality Technical Report nowhere refers to MESOPUFF as a guideline model.

38-104 This program was not used in the analysis of the Sunnyside STSA. The removal of this model from Table 3.2-2 is noted in the errata for the Draft Air Quality Technical Report.

38-105 VALLEY provides concentration estimates for a field of 112 receptors located at 7 distances on 16 quasi-radials. The scaling factor was selected such that adjacent receptors were separated by 5 kilometers. The grid center was chosen so that most sources were close to the center of the grid.

TSP impacts from area sources were added to the VALLEY output. SO_2 and NO_2 emissions from area sources were modeled explicitly by VALLEY.

Three-hour SO_2 concentration estimates were determined by multiplying the 24-hour concentrations by a factor of 3.6 (EPA 1977).

38-106 Please see pages iii-iv of the Air Quality Technical Report (Aerocomp Inc. 1983). U.S. Geological Survey topographic maps were digitized for use in the dispersion modeling.

38-107 As mentioned in response to comment 39-50, most (over 90 percent) particulate emissions result from surface mining. Area source impacts were simulated by a regression technique. Because this technique uses monitored air quality data, deposition is essentially built into the linear equation. (See response to comment 33-110.)

TSP impacts should be placed in perspective. As of 1974, the largest U.S. surface coal mine had a production rate of 7.5 million tons per year (MTPY). As noted in Table 1-6 of this EIS, the tar sand mined under the proposed actions would exceed 160 MTPY. Amoco alone is expected to process 105 MTPY of tar sand.

38-108 See response to comment 38-51.

38-109 See response to comment 38-54.

38-110 See response to comment 38-102.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-111 The trajectories are shown in Figure 2.1-3 of the Air Quality Technical Report (Aerocomp Inc. 1983). Meteorological details, including assumed wind speed, stability class, and mixing heights, are presented on pages 126-127 of this report. Frequency of occurrence was not estimated.

38-112 The emission rates were determined by methods outlined in Section 3.1.4 of the Air Quality Technical Report. The annual geometric means and the second highest 24-hour average concentrations for the sampling stations listed in Table 2.1-2 were used for the annual and 24-hour analyses, respectively. This issue has been clarified in Figure 3.2-4 of the errata sheet for the draft Air Quality Technical Report.

38-113 You are correct in noting that spatial resolution is one of the disadvantages of the regression technique.

38-114 Stack parameters were chosen after reviewing current literature on synfuel facilities. The following are the main information sources:

- Mono Power Company Plan of Operations, revised April 19, 1983.
- Daniels, J. I., L. R. Anspaugh, and Y. E. Ricker. 1981. Technology Assessment: Environmental, Health, and Safety Impacts Associated with Oil Recovery from U.S. Tar-Sand Deposits.
- Final EIS for the proposed Getty Oil Company Diatomite Mining and Oil Extraction Project, McKittrick Oil Field, Kern County, California. County of Kern, Planning Department, Bakersfield, California.

The annual emission rate is based on the number of operating days per year. The short-term emission rate is calculated by the following formula:

Annual Emission Rate x (365/number of operating days per year)

The number of operating days per year was an assumption made by BLM.

38-115 The mine site, spent tar sand area, commercial plant, and haul/access roads connecting these sites would encompass 1,000 acres, which converts to a 2-kilometer (km) area source width (1 acre = 0.004 km^2).

Surface mining involves processes such as drilling/blasting, overburden/product removal, overburden/product dumping, conveying, and haul/access road traffic. Release heights for these types of operations range from 2 meters for dumping to perhaps 5 meters for conveying. On the basis of this range, the 3-meter release height was selected as a representative value for the mining operations. Concentrations vary by 5 percent or less over release heights ranging from 1 to 10 meters.

RESPONSES TO COMMENT LETTER 38 (Continued)

38-116 For the VALLEY modeling, a 72-hour half-life was assumed for the NO_2, SO_2, and CO_2 modeling. For point source modeling of particulates, a 272-hour half-life was used. You are correct in stating that our half-life assumptions are in error. According to the 1980 EPA-proposed revisions to the Modeling Guidelines, pollutant half-life should not be considered in screening analyses for any pollutant. The error, however, has a negligible effect on the impacts.

By not using the half-life option (as recommended by EPA), short-term impacts increase by 4 percent at receptors 35 km from the source and by less than 1 percent at receptors 1 km from the source. For the long-term modeling, impacts increase by 2 percent at receptors 35 km from the source and by less than 1 percent at receptors 1 km from the source.

38-117 Table 2.1-2 has been retitled, as suggested, in the errata for the Draft Air Quality Technical Report.

38-118 See response to comment 38-49.

38-119 In no place does the Air Quality Technical Report state that the control agency dictates the type of control. The State of Utah is responsible for ensuring that PSD increments are not violated.

38-120 The analysis suggests that the project as proposed is not feasible. The intent of this study was <u>not</u> to determine the production level that meets the NAAQS or PSD increments but to determine impacts from facilities suggested by the lease applicants.

38-121 See response to comment 33-117.

38-122 See responses to comments 38-48 and 38-92.

38-123 See response to comment 33-110.

38-124 The maximum impacts occur at receptors near the proposed surface mining site, and overburden processing accounts for over 60 percent of the impact.

38-125 See response to comment 38-48.

38-126 See response to comment 38-120.

38-127 See response to comment 38-48.

38-128 As stated in Section 3.2.2.1 of the Air Quality Technical Report (Aerocomp Inc. 1983), stability class F and a wind speed of 2.5 meters per second were assumed in the 24-hour calculation. This condition provides a reasonable estimate of the second highest 24-hour concentration that would be experienced during a year.

38-128 Cont. The annual TSP concentration is a geometric mean.

38-129 The column labeled "Maximum Concentration" refers to concentration at the maximum receptor, which is described in Section 2.1.3.2 of the technical report. See response to comment 38-105 for the methodology used to calculate the maximum 3-hour concentration.

38-130 According to BLM estimates, Amoco must mine 133 percent more tar sand than Mono Power per barrel of synfuel recovered. That fugitive particulate emissions are proportional to the amount of material mined explains the large particulate impact differences between Amoco and Mono Power.

38-131 The photolysis rate is simply a function of solar zenith angle, which in turn, is a function of latitude, time of day, and time of year. Los Angeles was chosen because its latitude is near that of the Sunnyside STSA.

38-132 Further modeling would be needed to answer this question, which is considered beyond the scope of the analysis.

38-133 The simplification of combining multiple sources to form a single plume was only assumed for the visibility analysis and the worst-case photochemical smog scenarios. In these instances only the maximum impact was of interest, and thus the single plume simplification is conservative (not restrictive). In spite of this conservative approach, the calculated impacts are below the ozone standard. Thus, the criticism of this conservative approach is irrelevant.

38-134 See response to comment 38-54.

38-135 A conservative approach was adopted because of the lack of detailed emission and meteorological data.

Comment Letter 39

THE HUMANE SOCIETY OF UTAH

4613 South 4000 West
P.O. Box 20222
Salt Lake City, Utah 84120
Phone 968-3548

January 30, 1984

Mr. Gene Nodine, District Manager
U.S. Bureau of Land Management
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine,

We appreciated the opportunity to review the Sunnyside Combined Hydrocarbon Lease Conversion Draft EIS. We have several concerns about the information presented:

39-1 1. Under proposed actions, page 3-30, adverse impacts to wildlife are <u>only</u> considered to be significant if more than 10% of critical habitat is disturbed. HSU contends that any disturbance of critical habitat is significant, especially when illogical assumptions are made that involved animals are evenly distributed throughout their seasonal ranges and use of the range is uniform in its place in the animal's niche.

39-2 2. The grassy trails watershed historically contain much beaver habitat. The impacts to their survival have not been addressed in this document.

3. Overall losses to Big game species, small mammals, rodents, raptors, reptiles, and amphibians are completely unjustified to HSU. No monetary gain potential from these exploratory developments can trade-off for this massive loss of life and habitat.

4. Disturbance of wild horse range and the associated critical foaling areas and water sources is at entirely too high a level to be acceptable.

39-3 5. Losses of STSA animals would only be enhanced by illegal killings by employees of energy companies. If development is allowed, provisions should be included to disallow any carrying of firearms in the STSA by any such employes while on-the-job or while traveling to and from the jobsite.

39-4 6. Increases in human populations within the STSA will bring about increased pressure from domestic canines brought into the area.

DEDICATED TO THE ELIMINATION OF FEAR, PAIN AND SUFFERING OF ALL ANIMALS
Gifts and Bequests to the Society are deductible for income and estate tax purposes.

39-4 (cont.) This problem has not been addressed from either a potential loss situation or from the aspect of how these animals can be controlled with the present animal control agencies within the affected areas.

7. HSU cannot agree with the planned development of the STSA due to the long-term adverse effects inherent with implementation of the proposed actions. Losses involving water quality and decreased wildlife populations, as well as wildlife habitat, are totally unacceptable at any of the listed levels.

39-5 8. Stated STSA plans appear so vague that exact locations of impacts are unable to be adressed with any accuracy, therefore accurate assessments of disturbance factors cannot be analyzed satisfactorily.

39-6 9. Loss of springs and streams will result in loss of riparian areas. Simple replacement with water of like quality and quantity will not supply adequate replacement of this riparian habitat. Specific details of water replacement should be discussed.

39-7 Due to many areas of incomplete data concerning wildlife, HSU supports the need for serious wildlife surveys throughout the STSA <u>before</u> exploration and development are allowed. These surveys and studies could better identify those areas and species that would be impacted by energy development within the STSA.

We appreciate your consideration of our comments.

Sincerely,

Helen D. Robison

Helen D. Robison
Senior Investigator

RESPONSES TO COMMENT LETTER 39

39-1 The wording in Section 3.A.4, Wildlife, has been changed. Also see response to comment 33-99.

39-2 Beaver still occur in small numbers in portions of the watershed, but impacts to them are expected to be insignificant. In its reports to us, the Utah Division of Wildlife Resources did not mention beaver as being a species that could be affected in this area.

39-3 In its permitting process, BLM has no authority to prohibit firearms. The suggestion can be made to the various companies, but no legal means of enforcement exists.

39-4 A discussion of feral dogs has been added to Section 3.4.A, Wildlife.

39-5 See page 1-1, paragraph 2, column 1 of the draft EIS. This paragraph states the concept used in this EIS for analysis.

39-6 Specific details of water replacement will be addressed in the environmental analysis required for permit approval. See Summary for the revision.

39-7 See Appendix A-4, Uncommitted Mitigation Measures, for a listing of proposed willife studies to be completed before tar sand development in the STSA.

Comment Letter 40

United States Department of the Interior

BUREAU OF RECLAMATION

ENGINEERING AND RESEARCH CENTER

P O BOX 25007
BUILDING 67, DENVER FEDERAL CENTER
DENVER, COLORADO 80225-0007

IN REPLY REFER TO 0-1000

Memorandum JAN 27 1984

To: Gene Nodine, District Manager
Bureau of Land Management

From: Chief, Colorado River Water Quality Office

Subject: Review of Sunnyside Combined Hydrocarbon Leased Conversion Draft Environmental Impact Statement, November, 1983 (BLM)

This office reviewed the subject statement with special attention to the salinity impacts of the proposed tar sands development.

GENERAL

40-1 The use of the Colorado River Simulation System (CRSS) model was apparently used to predict a salinity increase of 1 mg/L TDS at Imperial Dam for a proposed depletion of about 40,000 acre-feet per year from the Green River. This predicted change, however minimal, does not properly address other water sources and related salinity impacts or acknowledge the significant, potential TDS impacts of surface disturbance.

Previous studies by Reclamation (contract study portion attached) have addressed the possible use of saline water collected in the Price-San Rafael drainages to support tar sand development. Appraisal-level studies indicate that if, for example, saline water from Desert Seep Wash were used for development of the Sunnyside area, a salinity reduction of 8.6 mg/L TDS could be realized at Imperial Dam. This alternative water supply contrasts with the projected use of fresh water from the Green River with a maximum expected increase of salinity of 1 mg/L. Hence, even if only a portion of the required water supply could be met from saline sources, significant salinity benefits could be realized in the Lower Colorado River Basin. Moreover, from the preliminary economic analysis performed on the use of Price drainwater, a cost-effectiveness of $511,000 per mg/L reduction and a cost of water (delivered) of $276 per acre-foot appears promising.

40-2 In reviewing the meager information provided in the bitumen recovery process description, water quality requirements are not indicated for the Hot Water, Solvent Extraction, or Thermal Extraction processes.

40-3 It is important to recognize the water supply option of saline drainwater and, particularly, to evaluate the potential benefits due not only to salinity control but also to the conservation of fresh water and related environmental benefits. Reclamation is prepared to work with the BLM and cooperating industrial participants in exploring saline water use opportunities for the Sunnyside Tar Sands Area.

SPECIFIC

40-4 1. Page S-2 and 1-12: The total collective disturbance of 35,945 acres of soils with some surface mine excavation of 600 to 800 feet will dramatically affect soil erosion rates, sediment yield, and salt pick-up in large watershed areas. An attempt to analyze watershed impacts on salinity was provided on page 3-3, covering the Grassy Trail Creek watershed. This technique needs to be expanded to address the cumulative effects of surface disturbance on the salinity of the Green and Colorado Rivers.

2. Page 1-15: The fact that a small amount of soda ash is added to process water for hot water extraction supports the idea that saline water might be used in the process.

40-5 3. Page 1-37: The suggested alternatives for mitigation of potential impacts to water resources are very limited. Instead of developing poorer quality sources for irrigation purposes to reduce demands on fresh water, the industrial use of saline water should be explored throughout the proposed Sunnyside system.

4. Page 3-8, 3-9: The analysis of salinity impacts provides only general, qualitative changes of TDS in Range Creek and Price River (Table 3-4). In the table, TDS changes are described as "large, little, or no change." In future analysis, the water quality of withdrawals will have to be taken into account to identify salt loads and concentration effects in both these sub-basins in order to predict the net effect at Imperial Dam.

Al R. Jonez

Enclosures

Copy to: Commissioner, Attention: 115
Regional Director, Salt Lake City, Utah, Attention: UC-700, UC-150
Project Manager, Saline Water Transport and Use Office
Chief, Division of Planning Technical Services
w/ enclosures to each

2

RESPONSES TO COMMENT LETTER 40

40-1 The volume of drainage from the disturbed areas that contain increased dissolved solids is so small that these increased dissolved solids would have no measurable effect on Green River water quality.

40-2 These requirements are still unknown. If low-quality water is used, the company would have to provide treatment to meet their needs.

40-3 The decision maker may make decisions that have been analyzed or fall within the scope of this EIS. If changes or new alternative are proposed, they would have to be subject to environmental analyses before being authorized by the federal decision maker. Therefore, the planning and environmental analysis for Utah's water policies are properly a part of that planning effort. Any water quality regulation that results from that effort could then be used to plan and regulate water aspects of tar sand development.

40-4 The plans of operations are now so conceptual that no sediment and turbidity concentrations can be determined. The summary of watershed impacts in Section 3.A.1, Water Resources, has been changed to state that increases in the salinity level of the Green River would be insignificant because of discharges from the streams in the STSA.

40-5 See response to comment 40-3.

Comment Letter 41

STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114

SCOTT M. MATHESON
GOVERNOR

February 3, 1984

Mr. Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Gene:

Enclosed are the state of Utah's comments on the Sunnyside Combined Hydrocarbon Lease Conversion Draft EIS. These comments, prepared by the Utah Mineral Leasing Task Force, reflect many of the same concerns that the state voiced on the Regional Draft EIS in my letter of January 17th to Roland Robison.

While the state of Utah has been supportive of tar sand development and remains so, I am concerned with the ability of the state and local governments to anticipate and mitigate the potential impacts arising from such development given the speculative nature of the data contained within the EIS. It is my judgment that the timing for the submission of the development plans, as required under the Combined Hydrocarbon Leasing Act, is much to rapid. That, coupled with undefined diligence requirements leads to a high level of uncertainty surrounding potential impacts.

In addition to this primary concern, the Mineral Leasing Task Force has identified two major problems in the DEIS. The first deals with air quality impacts resulting from the level of development as analyzed in the DEIS. The air quality limitations, as explained in the attached comments, would make the level of development analyzed in the DEIS infeasible. Secondly, as also noted in the attached comments, the state feels that the analysis of a "worst case" scenario has been improperly formulated and must be rectified before the process can proceed.

Specific comments regarding socioeconomic issues, wildlife impacts, air and water quality degradation, transportation, and lack of consistency with the Draft Regional EIS are attached.

Mr. Gene Nodine
February 3, 1984
Page 2

I fully expect that due consideration will be given to the state's concerns.

Sincerely,

Governor

SMM:tar
Attachment

cc: Roland Robison

SPECIFIC COMMENTS ON THE SUNNYSIDE COMBINED HYDROCARBON LEASE CONVERSION DRAFT EIS

UTAH GEOLOGICAL AND MINERAL SURVEY

The concerns raised over the Sunnyside DEIS are much the same as those expressed concerning the Regional DEIS.

41-1
1. Of the 18 maps included in the report, there are no geologic maps, resource maps, or any other maps which relate or show the distribution, grade, overburden, or geologic aspects of the resources.

41-2
2. The separate plans of operation and the data each company has submitted in support of its applications are not included in the DEIS. Conclusions are drawn in the DEIS that are based on plans of operations which are only referred to in a superficial manner.

This document can only be viewed as very general, generic, and incomplete with regard to definition of the resource and plans for exploration, development, and exploitation.

41-3 A definition of the resource that at least utilizes the information which is already available from the literature and industry sources is the primary essential topic that must be addressed before any other impacts can be adequately identified or assessed.

UTAH ENERGY OFFICE

41-4

'Purpose and Need' of Tar Sand Leasing Program

The lease conversion program established by the 'Combined Hydrocarbon Leasing Act of 1981' is viewed as removing historical impediments (technical categorizing of tar sands) to tar sand development. The program is seen as enhancing the process by which industry can plan for development of the resource by insuring those developers have a clear and unencumbered claim to the in-place resource. It is the UEO's position, however, that the leasing program as proposed contains serious inconsistencies which could, ironically, slow the rate of development.

The inconsistencies stem from language within the Act which requires detailed development plans to be submitted to the BLM by November 15, 1983. The BLM used these plans in deriving aggregate estimated impacts. The UEO has canvassed eleven firms who report to have development plans for tar sand resources in Utah. Our findings indicate that development of tar sand in Utah is in only a conceptual stage, the sole exception being the preliminary work performed by the Chevron-Great National project. Regardless of BLM's disclaimer that they must accept plans submitted (at face value) (Sunnyside DEIS, pp. 1-45), the fact that all estimated impacts are based on a set of development plans which, by their nature, are highly uncertain implies that the estimated impacts are also uncertain. It is a simple fact that the impacts reported in the Sunnyside Draft EIS cannot be substantiated by referencing the concreteness of development plans. Such a high degree of uncertainty surrounding the validity of information contained in the DEIS would appear to leave the BLM (and thus, the lease conversion program) open to serious challenges (including legal challenges). The net result could be an actual slowing of development of Utah tar sands.

41-4 (cont.) The basic problem of the lease conversion program, as proposed, stems from poor timing between the lease conversion program and the maturity achieved in research and development work on tar sand resources. The Act has forced industry to provide detailed development plans when basic resource characterization has not been completed by most firms. The Act is viewed as being related to the Energy Security Act and, in that regard, enhancing the nation's domestic energy supply. However, the crisis environment which preceded the passage of the Energy Security Act has now subsided and decision-makers need not provide hastily created programs designed for quick implementation. The very fact that all tar sands projects face poor project economics is indicative of the more stable world energy market. The implication is that the sense of urgency contained in the DEIS to lease tar sand resources and to convert existing leases is not well founded and has contributed to the inconsistencies in the proposed leasing program.

41-5

Comments on Technologies and Alternatives

The draft EIS gives a generic overview of the primary tar sand development methods. This description, however, is of potential development methods due to the fact that no single method has been shown to be commercially viable at this time. Extensive research and development needs to be done in order to assess commercial viabilities. This research and development must begin with extensive resource characterization because the applicability of the development methods are dependent, to a large degree, on resource characteristics. Such characteristics are largely unknown in sufficient detail at this time. The uncertainties in resource characteristics and the specific application of technologies makes any environmental assessment speculative, at best, and cannot anticipate all likely impacts. Therefore, a phased approach to development which relies on detailed data accumulated at each phase is suggested as a reasonable approach to decision-making.

Mitigation Alternatives

41-6 In Chapter 4, Section 4.A of the DEIS the BLM sets forth ten additional site-specific mitigation measures to minimize environmental impacts. If these additional measures are required, as BLM states they will be, then exploration activity will be effectively halted which, in turn, will preclude development of the Sunnyside tar sands. This problem arises from the requirement in Section 4.A p. 4-3, mitigation measure #10 that states, "to protect deer summer range, exploration, drilling, or surface development activity will not be allowed from mid-May to November." Since access is not possible from December to mid-May due to winter conditions and the majority of the leases are included in the deer

41-6 (cont.) summer range, exploration and subsequent development would effectively be halted.

DIVISION OF ENVIRONMENTAL HEALTH

Air Quality

With regard to the high particulate concentrations caused by dirt roads, a mitigation plan needs to be analyzed. Since the areas near price and Wellington show violations of the particulate National Ambient
41-7 Air Quality Standards (NAAQS) without the conversion of hydrocarbon leases, improvements in the secondary road system will be needed to handle increased traffic from the tar sands operations. The amount of mitigation needs to be analyzed with regard to the cumulative impacts on particulate concentrations near these cities.

It is obvious that there will be problems with the permitting of major tar sands facilities given the present state-of-the-art techniques for processing the tar sands. The large particulate concentrations
41-8 associated with overburden removal will most likely prohibit the projects from processing the amounts of tar sands as proposed in the DEIS.

The DEIS should possibly analyze what the scale of production would be if all NAAQS are to be met. The fact that these projects cause new
41-9 violations of the NAAQS is enough evidence that the given scenario of hydrocarbon lease conversions is not viable.

Water Pollution Control

Since the mining and construction activities will occur over a large area and are to be in the headwaters of several tributaries to the Green
41-10 River, there will be great potential for decreased water quality. Greater detail into the impacts of these activities on water quality needs to be addressed.

If water monitoring effort is to be initiated, it is recommended that there be coordination with the Bureau of Water Pollution Control and that all water sample analyses be done by state certified laboratories.

Solid and Hazardous Waste

In this review, there is no mention of how the operation intends to manage the large volumes of non-hazardous solid waste generated by this
41-11 project and its impact on local solid waste landfills.

There is a possibility that hazardous wastes not uniquely associated
41-12 with the mining industry will be generated. We need to know if these wastes will be produced and, if so, how they will be managed.

Public Water Supplies

It appears, as the report indicates in general terms, there exists a large potential for major impacts to both existing and future drinking water supplies in the area. Therefore, the following comments outline

certain aspects which we feel need further consideration in the final EIS.

Currently, the communities of East Carbon and Sunnyside are undertaking the construction of a new culinary water treatment plant. These facilities will provide the reouired treatment of the surface waters drained into Grassy Trail Reservoir and will continue to be the sole source of supply. These facilities have been designed to treat
41-13 water of a reasonably high quality. Any reduction in this quality would partially, if not completely, render the facilities ineffective. Due to the current economic situation in these communities, it would be almost impossible for them to rectify the impacts or handle the increased financial burden from any increased operation and maintenance costs.

While many different mitigating or preventive measures can be proposed to eliminate the impacts to water quality, we seriously doubt that such concentrated mining activities could be undertaken on the watersheds without serious effects. Not only would these activities
41-14 lessen the water quality in terms of the obvious parameters, it now opens up the possibilities of chemical spills and other related similar accidental disasters.

In assessing the minimum firm yeild of Grassy Trail watershed as a drinking supply, it was learned that there would be critical shortages during drought periods for even the existing population. Therefore, any
41-15 proposed additional needs from anticipated growth or mining activities would only increase these shortages. This problem would be magnified if water pollution control techniques reduce runoff.

The degradation of water quality and the associated impacts need to be evaluated through an annual time frame to determine the most critical
41-16 problems. An example of such a problem would be the concentration of pollutants during low flow summer and fall periods compared to the times when there are larger runoff flows for dilution.

The report indicates Range Creek drainages are not currently being used as a drinking water source, but they are considered for future use. We feel that if there is to be any population growth in the area (maybe resulting from the tar sands mining activities), these waters should be
41-17 protected with as high a priority as those of Grassy Trail, since Range Creek appears to be the next most cost-effective source with sufficient quality for culinary water use.

Therefore, with the above comments in mind, any activities in the two referenced watershed areas should be severely restricted, if not totally prohibited. Of the different alternatives proposed in the report, the "Partial Conversion" alternative approach seems the most acceptable.

Sanitation

The DEIS does not include specifics on housing needs and food service facilities or plans, if any, for recreational facilities or suitability
41-18 of area for wastewater disposal. Complete plans would be needed for review prior to development.

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WILDLIFE RESOURCES

Chapter 1: Description of Proposed Actions and Alternatives

1. C Proposed Actions

Spent Sand Handling and Disposal

41-19 (page 1-19, column II, paragraphs 1-3) There is inadeouate discussion on the handling, disposal and reclamation of spent sand. A potential problem that exists is that of wind blown sand. How will the surface be stabilized prior to the application of a suitable plant growth material and subsequent reclamation? This is of special concern for those disposal areas on Range Creek. Unstable, wildblown sand would have a significant negative impact on both the fishery and other wildlife resources of this drainage. There is no discussion of the potential problem or measures to control it.

1. D Partial Conversion Alternatives and/or Special Mitigation

Constraining Criteria

(page 1-43, column I, paragraphs 1, 2, 4)

41-20 Paragraph 1: The coal unsuitability criteria in which protection of high interest wildlife was identified, related to underground coal mining and not surface mining. Its application as constraining criteria under this alternative is, therefore, inappropriate. The impacts from underground mining bear little resemblance to those of surface strip mining. In view of surface mining, more areas would be unsuitable than are identified by map 1-5. This paragraph, as well as map 1-5, is misleading since the criteria established does not apply to surface mining, but rather to underground mining.

41-21 Paragraph 2: Consideration of the importance of watering sources to wildlife should be included in this paragraph since livestock are not the only animals to be affected by the loss of such sources.

Chapter 3: Affected Environment and Environmental Conseouences

3. A. 1 Water Resources

Grassy Trail Creek Watershed

41-22 Grassy Trail Creek Reservoir contains a brown trout fishery. The Division of Wildlife Resources plans to manage it as such, and is negotiating with Kaiser Steel for public access. Spawning habitat for brown trout exists in the right and left forks of Grassy Trail Creek, and spawning has been documented there. Discussion of this fishery resource, and related impacts to it, have been omitted both in this section and in the Aouatic Wildlife section (p. 3-38). Additionally, Grassy Trail Creek below the reservoir contains a self-sustaining rainbow trout fishery. Deteriorating water ouality and increased sedimentation in the right and left forks of Grassy Trail Creek and reservoir will have a significant

41-22 (cont.) and negative effect on the fishery. By upgrading the road in Whitmore Canyon, traffic and fugitive dust will impact that portion of the Grassy Trail Creek fishery below the reservoir. Inclusion of this information into the DEIS is necessary for an evaluation of the impacts to Grassy Trail Creek and for consideration in the decision-making process.

Range Creek Watershed

(page 3D4, column II, paragraph 4; page 3-5, column I, paragrpah 3)

41-23 Paragraph 4: Increased soil erosion in the Range Creek watershed will significantly impact the trout fishery. There is inadeouate discussion which is not commensurate with the seriousness of the impacts to the fishery.

41-24 Page 3-5, Paragraph 3: The discussion states that one spring out of three present on the watershed would be lost. However, map 3-1 shows all three springs being affected in the Range Creek watershed. This discrepancy needs correction before meaningful analysis of impacts can be attempted.

Nine Mile Creek Watershed

(page 3-5, column II, paragraph 6; page 3-6, column I, paragraph 1)

41-25 The text states that out of 85 springs, 24 would be lost and 15 may experience reduced flows. Map 3-1 shows all 85 springs in this watershed as being impacted. This inconsistency makes it impossible to evaluate impacts.

Watersheds Tributary to the Green River

(page 3-6, column II, paragraph 2)

41-26 Map 3-1 shows all 35 springs in this watershed would be affected while the discussion here states that none of the springs would be impacted or that a few may possibly experience some flow depletions. The inconsistencies that exist between the discussion of these three watersheds and map 3-1 makes analysis of impacts to the springs and associated wildlife and vegetation impossible. The DEIS will need to correct these discrepancies before reviewers, including the decision-maker, can enter into any meaningful evaluation of the extent or seriousness of the impacts from the proposed actions.

Summary of Watershed Impacts

(page 3-6, column II, paragraph 5)

41-27 This summary internally contradicts itself. It states that impacts discussed would not be noticeable at the mouths of the streams, but the poor water conditions now existing at the mouths would extend further upstream. This situation has an impact, whether direct or indirect. The cause and effect relationship between impacts to the headwaters and an increase in poorer water ouality at the mouths is obvious. Any

41-27 (cont.) deterioration of water quality at the headwaters will be carried downstream to the mouths unless the water is treated before it reaches there. Secondly, any reduction of flows at the headwaters will cause an increase in poorer water quality at the mouths. This summary, as such, is irrelevant to watershed impacts and has no bearing on the analysis of such impacts due to its incongruity. Therefore, it should be deleted from this discussion or reworded so it is pertinent to impact evaluation.

Special Watershed Management Areas

(page 3-7, column II, paragraph 4)

41-28 Specific mitigation details for the protection of special watershed management areas need to be included in the DEIS in order for reviewers and the decision-maker to objectively weigh the consequences of the proposed action and the alternatives upon the environment.

Water Supply and Salinity Impacts

(page 3-8, column I, paragraph 4)

The lower sections of the Price River experience severe flow depletions in summer and winter. Increased releases from Scofield Reservoir may be necessary during those low flow periods to meet projected water demands for the proposed projects.

Approximately 11 miles of the Price River, below Scofield Reservoir (section 8 and 9), are rated as Class II cold water fishery. Only 308 miles of Class II waters exist in Utah. Class II waters are highly productive and of significant importance to the state's sport fishery. This stretch of water supports approximately 1,020 fish per mile.

41-29 Should downstream project demands necessitate increased releases from Scofield, there could be a significant impact on this fishery. Spawning and nursery habitat could be impacted from high flows and angler success could decline substantially. This would be an indirect impact as a result of project development and needs adequate discussion as such in the DEIS.

3. A. 2 Socioeconomics

Law Enforcement

(page 3-17, column I, paragraph 1)

41-30 An increase in fish and game violations can be expected as a result of an increase in human population. Law enforcement effort would have to increase at increased cost to the state. This needs discussion as a project related impact.

41-31 Figures concerning Emery County's project related law enforcement demands have been omitted. This information should be presented.

Other Affected Industries

(page 3-18; page 3-19)

41-32 Expenditures for fishing licenses, numbers of fishermen and revenues generated as a result of fishing have been completely omitted in this discussion. The DEIS needs to correct this deficiency and insure that the information is as complete and accurate as possible. The data will be necessary for evaluation by the public and the decision-maker in considering impacts and alternatives.

Quality of Life

(page 3-20)

41-33 Quality of life also encompasses an individuals opportunity to pursue consumptive and nonconsumptive wildlife related activities along with other facets of outdoor recreation. The proposed project will affect enjoyment of such pursuits and reflect a project related impact to the quality of life. It, therefore, warrants discussion in this section.

3. A. 3 Soils and Vegetation

Vegetation

(page 3-26, column II, paragraph 4, paragraph 6)

41-34 Paragraph 4: 645 acres of riparian vegetation will be disturbed. What percent is this of the total riparian vegetation present on the main block?

41-35 Paragraph 6: It is estimated that 2-5 years will be required for grasses of this type to recover. However, grasses do not characterize a riparian area. How much time will be necessary for forbs, shrubs and trees to recover? These are the components that distinguish riparian areas from others.

Reclamation

(page 3-30, column I, paragraph 1, 2, 3)

41-36 Paragrpah 1: This paragraph is misleading. An increase in forage from a more dominant grass-type will have a negative impact on wildlife. The type of forage furnished by grasses would only benefit livestock. It would be of low value to the majority of wildlife species. This needs to be emphasized.

41-37 Paragraph 2: The change in plant diversity would not only affect habitat suitability, but would eliminate some wildlife species from this area altogether.

41-38 Paragraph 3: There is inadequate discussion of the "special" agronomic measures that would be used to reclaim the spent sand disposal areas. The details of such measures are needed for a suitable evaluation of

41-38 (cont.) impacts and mitigation.

3. A. 4 Wildlife

Impact Significance Criteria

(page 3-30, column II, paragraph 1)

41-39 All summer range on the STSA is critical mule deer habitat. Any loss of "critical" habitat is significant. This is especially important when viewed cumulatively with the losses of this habitat type resulting from many other developments occurring in the area. The OEIS should recognize and discuss these potential losses.

41-40 Indirect impacts from increases in the human population will not be restricted to just those illegal activities described. Other indirect impacts would include increased fishermen and hunter competition for a limited to dwindling fishery and wildlife resource, increased hunter and fishermen contact, a degradation of experiential quality, and a lowering of hunter and fishermen success.

Wildlife Habitat

(page 3-32, column I, paragraph 1, 4, 7)

41-41 Paragraph 1: The pinyon-juniper habitat type in the STSA furnish critical and high priority winter habitat, the value of which exceeds the connotation of "important" that the document assigns to it. the OEIS should be more specific to the nature and value of this habitat type.

41-42 Paragraph 4: The statement, "It is utilized mainly for cover rather than forage," in the discussion of the mixed conifer type is misleading. It is true only of big game. A host of other wildlife species; including the snowshoe hare and blue grouse, depend on this type for their livelihood. The OEIS should not attempt to play down the importance of the mixed conifer community to wildlife.

41-43 Paragraph 7: Other direct impacts to aquatic habitat that need discussion are sedimentation and loss of the stream channel itself.

Big Game

41-44 (page 3-33, column II, paragraph 1)

The 11% collective and 16% cumulative losses of summer range discussed are misleading in that these losses are analyzed in view of total summer range available on a herd-unit-wide basis, neglecting the compounded removal of summer and winter range by other types of development occurring throughout the rest of the herd unit. The impacts on the STSA are not an isolated phenomena within this herd unit, but are in addition to all the other currently existing or planned impacts. Comparing only the 88,926 acres of summer range within the main block to the collective and cumulative losses expected in the STSA, then losses would be 31% collectively and 34% cumulatively.

(page 3-34, column I, paragraph 2; column II, paragraph 1)

41-45 The assumption that mule deer are evenly distributed thorughout their seasonal ranges is biologically unfounded and incorrect. Subtle biotic and abiotic factors make specific portions of their seasonal habitats more important than others, even though the entire range may appear fairly homogenous in structure and composition. If 11% of summer range impacted constitutes the entire fawning habitat for the herd, then deer losses would be significantly more severe than the 11% mentioned. This holds true for the winter range as well.

41-46 The OEIS is not in a position to analyze impacts to deer or wildlife in general. Crucial data regarding the location and extent of fawning/calving grounds, migration routes and movements within both winter and summer range are lacking. Additionally, the proposed plans of operations are much to vague and it is not known exactly where impacts will occur.

41-47 40 CFR Part 1502.22 of the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act states:

> When an agency is evaluating significant adverse effects on the human environment in any environmental impact statement and there are gaps in relevant information or scientific uncertainty, the agency shall always make clear that such information is lacking or that uncertainty exists.
>
> (a) If the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.
>
> (b) If (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are exorbitant or (2) the information relevant to adverse impacts is important to the decision and the means to obtain it are not known (e.g., the means for obtaining it are beyond the state of the art) the agency shall weigh the need for the action against the risk and severity of possible adverse impacts were the action to proceed in the face of uncertainty. If the agency proceeds, it shall include a worst case analysis and an indication of the probability or improbability of its occurrence.

In view of 1502.22, this data would be needed for a "reasoned choice among alternatives." As such, the decision-making agency would be responsible for collecting the necessary data or evaluating the risks to proceed with the action in the absence of such information. The responsibility of the OEIS is to inform the public that uncertainty does exist and that impacts could be potentially more severe. The 11%

41-47 (cont.) displacement or loss of deer is the minimum predicted impact and not a worst case scenario as required.

(page 3-35, column I, paragraph 4; column II, paragraph 1, 3)

41-48 Column 1, paragraph 4: The discussion of impacts to elk habitat has the same problem as the discussion of impacts to mule deer habitat discussed above on page 3-33, column II, paragraph 1. When comparing losses with only the 62,956 acres of elk range on the main block, there would be a 30% collective loss and 48% cumulative loss.

41-49 Column II, paragraph 1: Although elk numbers are currently low, the herd is new and is establishing use patterns for the area. These use patterns could be significantly altered for a long time due to project disturbance.

41-50 Paragraph 3: Bighorn sheep in the area are Rocky Mountain bighorn sheep and not Desert bighorn.

Reptiles and Amphibians

(page 3-36, column II, paragraph 6)

41-51 The discrepancy that exists between springs lost, as discussed under section 3.

41-52 A. 1 Water resources, and those indicated on map 3-1 need to be resolved before impacts to amphibians can be discussed or evaluated.

Birds

(page 3-37, column I, paragraph 2)

41-53 There appears to be a contradiction between the number of agricultural acres lost under this section and those discussed under the Agriculture Summary (p. S-4, column I, paragraph 3); 5,636 acres vs. 933 acres. This contradiction should be resolved.

Aquatic Wildlife

(page 3-38, column I, paragraph 1, 2)

41-54 Paragraph 1: Brook trout are not known to occur in any of the streams of the STSA.

41-55 Paragraph 2: Range Creek supports an excellent fishery, not just fair.

41-56 As mentioned above in section 3. A. 1 Water Resources, Grassy Trail Creek Watershed, a brown and rainbow trout fishery exists here. This needs inclusion and discussion in this section.

41-57 Secondary impacts to the fishery resource have not been brought out. An increased human population will place increased fishing pressure and demand on waters outside of the main block. This, in turn, could tax Division of Wildlife Resources ability to provide catchable trout to meet

41-57 (cont.) this demand. There would also be an additional need for law enforcement on more popular waters. The OEIS is obligated to discuss secondary impacts as they relate to the proposed action and alternative.

Chapter 4: Site Specific Mitigation, Monitoring, Unavailable Adverse Impacts and Long-Term Environmental Consequences.

4. A. Site-Specific Mitigation

Water Resources

(page 4-1, column II, paragraph 3)

41-58 There is inadequate discussion as to the replacement of lost water. When springs or streams are lost, the riparian vegetation associated with them will also be lost. This, in turn, will impact those wildlife species peculiar to that type of community. Replacing water of like quantity and quality will not offset these impacts if the water is held in stock tanks, storage tanks or reservoirs. Specific details are needed.

Wildlife Resources

(page 4-3, column I, paragraph 1-4)

41-59 The scope of the OEIS is to analyze impacts expected from commercial development (p. 3-1, column I, paragraph 3) and certain types of mitigation are, therefore, assumed to minimize these adverse impacts. However, the site-specific mitigation proposed for wildlife only relates to the exploratory stage. This is misleading and inadequate for the purposes set forth in the OEIS for analyzing impacts from commercial development and appropriate mitigation as such. Furthermore, 40 CFR 1502.14(f) and 1502.16(h) requires that appropriate mitigation measures be included. Mitigation designed to offset impacts from exploration are clearly inappropriate for the analysis and mitigation of commercial level impacts.

4. C. Unavoidable Adverse Impacts

4. C. 1 Proposed Actions

Wildlife

(page 4-5, column II, paragraph 2, 3, 4)

41-60 Paragraph 2: Map 301 shows 147 springs would be affected by the proposed action, not 24. Not only is water at stake, but also the riparian vegetation that it supports. How will the complete loss of flow in Range Creek be mitigated? Simply providing water does not take care of the replacement of riparian vegetation. There needs to be more specific details.

41-61 Paragraph 3: The 6,500 acres of steady state disturbance is misleading as pointed out earlier in the DEIS (p. 3-32 - 3-33, Terrestrial Wildlife). Calculations for land disturbance determined how much land

41-61 (cont.) would be out of productive use on a steady state basis. It has been estimated in the DEIS that possibly 100 years would be reouired for disturbed areas to reach preconstruction forage production. The DEIS is much too vague as to what level of revegetation is considered "substantial." Obviously, from a wildlife point of view, several decades may be reouired for productivity to recover. However, if the OEIS considers establishement of only a ground cover as necessary before another 6,500 acres is disturbed, then the amount of land removed from productive wildlife use will exceed the 25% maximum disturbance allowed. If this is the case, then this measure is of no benefit in minimizing impacts to wildlife. The DEIS needs to be more clear and specific on this point.

41-62 Paragraph 4: Sage grouse do not use aspen communities. Mitigation No. 6 will be of no value to sage grouse and the DEIS should not present it as such.

Wildlife

(page A-4-2, column I, paragraph 6)

41-63 Number 7 should not be recognized as mitigation, but as a negative impact resulting from project development.

The studies identified in this section, in and of themselves, are not mitigation. The studies would serve to identify sensitive areas, conflicts and potential impacts, so mitigation could be planned and implemented.

Aside from the above discussion, we have the following concerns and recommendations.

1. The wildlife studies identified in Appendix A. 4, in our view, are necessary for a reasoned and intelligent choice among alternatives. The studies should be done prior to lease approval and commitment of the tar sand resource.

41-64 2. The site-specific wildlife mitigation proposed in Chapter 4 is patently inappropriate for commercial level impacts. The impact analysis of the DEIS is for commercial development, not exploration. Mitigation for wildlife, therefore, must address commercial development, not exploration.

41-65 3. It is doubtful that the first 6,500 acres disturbed will have recovered to the point of supporting productive wildlife habitat before the next 6,500 acres is opened up. The amount of land removed from productive wildlife habitat will be in excess of 25% at any one time as development proceeds.

To facilitate recovery time, we recommend vegetation be "clump" planted from the new site being cleared onto the old site reclaimed. This could be accomplished by removing portions of the soil mantle with plants intact and placing it on the site to be reclaimed. Secondly, we recommend tubelings and container grown plants be used

41-65 (cont.) in the revegetation process to further speed recovery.

41-66 4. The OEIS does not consider the Guidelines for Habitat Modification in Sage Grouse Range adopted by the Western Association of State Game and Fish Commissioners and the land management agency in the discussion of impacts to sage grouse on the STSA. DWR considers these guidelines as necessary to the protection and enhancement of sage grouse habitat. The DEIS should inform the public and the decision-maker that the proposed action would violate these guidelines.

41-67 5. The term "Uncommitted Mitigation:" carries a negative connotation and may bias the final mitigative stipulations. We recommend the term "Uncommitted" be deleted and replaced with "Other Potential" mitigation.

6. DWR would prefer the Partial Conversion Alternative - Special Mitigation with some modification for the following reasons:

   A. The Plan of Operations and the DEIS have not demonstrated "reasonable protection of the environment and diligent development of the tar sand resource."

   B. Only two of the five companies have committed themselves to mitigation of some type.

   C. Too many uncertainties exist in the methodology and technology of tar sand extraction, potential impacts and the potential for reclamation. Partial conversion would allow for the "bugs" to be worked out and to demonstrate that adeouate measures can be taken to protect the environment, reclaim disturbed areas and perfect other uncertainties. It does not seem wise to "experiment" on such a large scale basis as the proposed or unitized action would reouire.

   D. Partial conversion would protect sensitive wildlife areas. However, modifications would be necessary since the unsuitability criteria developed related to subsurface mining, not surface mining.

DEPARTMENT OF NATURAL RESOURCES

41-68 Chapter 1

The draft EIS states in Section 1.A.1 that, "The lease conversion decision must be based upon a plan of operations submitted by the lease/operator for development of the tar sand resource." Later on in Section 1.C.2 the draft EIS states that the BLM assumed that all portions of the conversion area would be disturbed to varying degrees by the applicant even though the plan of development submitted by the applicant makes no such assumption or statement of fact. The conversion decision and environmental assessment must be based on the applicant's proposed plan of operation, not the BLM's. There is no basis for the BLM to

41-68 (cont.) assume the "worst-case" analysis as indicated in Section 1.C.2 of the draft EIS. This is particularly relevant when deciding on full conversion or partial conversions. Because of the speculative nature (as indicated in the draft EIS) of the development plans, why should the BLM assume a greater level of development than the applicants? The conversion decisions should be based strictly on the proposed activity.

41-69 The partial conversion alternative is more speculative than the proposed actions alternative. It does not consider the applicants proposals or the in-ground resource. There is a need to provide alternatives for protection of other resource values. The draft EIS states in Section 1.D that, "The (partial) alternative, therefore, should not be viewed in an all or nothing situation...," but it appears to be so when consulting Table 1-5. In this table, all the critical areas are eliminated from the applicants areas. Isn't this all or nothing in terms of the critical areas identified? Is it necessary to eliminate all critical areas from the proposed actions? For example, grazing allotments can be adjusted or new allotments assigned to replace those lost by the proposed actions.

41-70 The proposed actions indicate that water diversions are necessary from the Green River in Desolation Canyon. The draft EIS, however, makes no analysis or gives no indication of where the diversion structures are to be located or whether this document can or should serve as the decision authority for such issues affecting the recommended designation of the Desolation Canyon as a Wilderness Area, or the recommendation that the Green River in Desolation Canyon be studied for wild and scenic river status. There must be an analysis done on the effects of these decisions on the WSA and the river including a discussion of alternatives which could accomplish all these actions. There is also no analysis of the technical or economic feasibility of constructing diversion structures

41-71 and a pipeline from the river to the project sites with an elevation gain of 4,000 to 5,000 feet depending on specific locations. Such a pipeline would have to cut through the WSA. Given that this action would not take place for many years in the future, can they be accomplished through a wilderness area?

Chapter 2:

41-72 In the comparative analysis Table 2-1, the data indicates that there is a moderate-to-high potential to exceed state water quality standards for all proposals except the No-Action Alternative. Does this imply that all alternatives except the No-Action Alternative fail to provide "a plan of operations which assures reasonable environmental protection?" Also, air quality violations for PSD and NAAQS occur for most all alternatives. Again, what combination of actions will provide the assured reasonable environmental protection?

Chapter 3:

41-73 The draft EIS fails to mention that the Price River and Range Creek are included on the Nationwide Rivers Inventory for possible inclusion in the National Wild and Scenic Rivers System. Also, the draft EIS indicates that only the portion of the Green River from the Yampa River

41-73 (cont.) to Range Creek has been identified for possible wild and scenic river status. The draft EIS should include that the portion of the Green River from Range Creek to the Colorado River which is also under consideration for wild and scenic river status.

41-74 On page 3-42, the draft EIS suggests that commercial river runner companies could be positively impacted by the proposed actions due to increased demand. The river management plan specifies the user days allocated to the companies and to the non-commerical users. What is the unused allocation for the Desolation Canyon? Due to the need to preserve a quality river trip experience and to protect the river corridor resource from over use, it isn't likely that user days will be increased in any significant amount. The criteria for allocation is based on carrying capacity data and not the need to increase revenues.

41-75 Again, the draft EIS fails to describe or assess the water diversion impacts (pp. 3-67-69) on the Green River and the Desolation Canyon WSA. If as stated in these pages that "new comers" would place greater demands on the river and wilderness areas, then doesn't this suggest that alternatives to mitigate and protect these resources are necessary? Is it necessary (as stated on p. 3-69) that the land use plans be amended to eliminate conflicts or should amendments to the proposed actions be analyzed and suggested?

Chapter 4:

41-76 The impacts to the proposed wilderness resources including the Green River should be listed as long-term environmental consequences if the proposed actions are pursued.

UTAH DEPARTMENT OF TRANSPORTATION

General Comments

41-77 Map 1D3 shows the Sunnyside STSA and the 16 coal mines considered as interrelated projects used in assessing the impact on the transportation network. If the North Horn Mountain Lease Tract is used in the analysis, shouldn't the Trail Mountain, Ferron Canyon, Pines and Quitchupah Tracts also be considered? The SUNEDCO holdings are near an existing mine (Tower Resources) and five coal lease tracts under consideration for Round II. Shouldn't they be considered in the analysis?

41-78 Tables 3.A.8-1, 3.B.8-1, 3.C.8-1 should show the levels of service for the projected baseline volumes, as well as the levels of service after the applicant-related increase has been added, so the reader can compare the two.

41-79 The DEIS does not address worker transit under any of the alternatives. It could be mentioned under Uncommitted Mitigation Measures, e.g. Transportation - Applicants sponsor or at least encourage a worker transit system. Busing, vanpooling and carpooling would reduce the impact on the highway network.

Specific Comments

Page(s)	Line No. (s)	
41-80 1-10	Map 1-3	The road shown as State Route 53 (Nine Mile Canyon) is not a state highway.
3-66	43	Change SR-53 back to Carbon County 381.
3-67	5	Change SR-53 back to Carbon County 381.

OFFICE OF PLANNING AND BUDGET AND
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT

This EIS has some strengths over the regional EIS. It does include a cumulative analysis, including interrelated projects, and it also shows the impact projections with respect to the baseline projections. However, there are places within this document where the analysis is deficient. The data presented is limited to population projections and an assessment of personal income. 41-81 Data on existing community infrastructure, infrastructure standards, future infrastructure forecasts and a fiscal impact analysis are all missing.

41-82 In addition, several modifications to the socioeconomic analysis were made since the socioeconomic technical report was published. These modifications were made on a ratio basis. These modifications create a great deal of confusion as to which set of impact numbers represent the best information. It is understood these modifications were made to represent last minute changes in industry plans. However, industry plans are always subject to change, and no document can ever represent the latest thinking. These changes make it inconsistent with the regional EIS as to the impacts from development of the Sunnyside STSA. We believe the EIS would be more valid if it were consistent with the detailed analysis included in the technical report than to make "quick and dirty" fixes attempting to represent the latest industry plans.

RESPONSES TO COMMENT LETTER 41

41-1 As stated in the draft EIS section 1.C.1, Exploration, and 1.C.2, Introduction, oil and gas leases do not permit tar sand exploration, and geologic data on which to map tbe aspects of the tar sand resource do not exist. The applicant's intent is to enter an exploration phase if conversion is approved.

41-2 The original plans of operations are too long to be put in this EIS but may be inspected at BLM's Utab State Office. Summaries of each plan of operations are included in Appendix A-2.

41-3 Definition of the resource has been considered. In 1983, information from known sources was gatbered and compared in conjunction with efforts to identify production scenarios for the Utab Combined Hydrocarbon Leasing Regional EIS (BLM 1984). Volume 1, Chapter 3 of that document describes the tar sand resource and reports a range of 3.5 to 4.0 billion barrels of in-place bitumen (oil from tar sand) at the Sunnyside STSA. Exploration data for the entire STSA is incomplete and that definition of this resource will continue to undergo adjustment in amount, precise location, and mineability. We used the best existing information in assessing impacts.

41-4 BLM recognizes tbe problems noted in the comment. To comply witb botb the Combined Hydrocarbon Leasing Act and the National Environmental Policy Act, BLM bas worked with the applicants to identify the best and most complete plans for development . Where information was lacking, BLM followed the normal course of assuming a worst-case analysis. Thus, even with future cbanges in project design and technology, environmental impacts are not expected to exceed those described in the EIS. Tbe lease decisions and stipulations will be based on this premise.

With the tar sand program a pattern is expected to evolve from the present incomplete stage of maturity through continual refinement in resource definition and process technology. The mine plan updating and review/approval process provides the needs of such revision in a phased approach.

As the comment states, any tar sand development of a commercial scale would be affected by the economics of tbe world energy market. BLM's objective (as interpreted from the intent of the Combined Hydrocarbon Leasing Act) is to have federal leases for tar sand in-place so that this aspect needed for private development will not impede sucb development should market conditions change. The sense of urgency on lease conversions is mandated by the Combined Hydrocarbon Leasing Act, whereas greater flexibility exists with the timing of new, competitive leasing. Note that tbe Sunnyside EIS provides a no action alternative.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-5 See response to comment 41-4. In addition, note that BLM has initiated potential changes in implementing regulations to increasingly emphasize extensive resource characterization as a possible lease stipulation. This subject was among items discussed at a public meeting held in Salt Lake City on February 23, 1984. In addition, companies with strong intent to use the tar sand resource will undertake resource exploration (some already have done so) regardless of any forthcoming changes in regulations.

Though the uncertainties in resource characteristics and technologies make environmental assessment difficult, the endeavor is legally required and provides much information useful in establishing lease provisions and stipulations as a framework for the future. Existing environmental conditions are well known. The approximate size and location of impacts from various alternatives have been identified. A phased approach to development is expected to occur within the limits of the environmental impacts identified. Only a drastic change in technology or scale of development, not now foreseen, would greatly change the nature and extent of adverse impacts beyond the worst-case analysis. Should such a drastic change be proposed in an applicants revised plan of operations, it likely would be outside of the lease terms and certainly would require more environmental analysis and plan of operations reviews/approvals.

41-6 See response to comments 33-129 and 33-130.

41-7 Primary and secondary particulate standards have recently been exceeded in the Price-Wellington area. For example, in 1977 the primary 24-hour particulate standard (260 ug/m^3) and the secondary annual particulate standard (60 ug/m^3) were exceeded at Price. Any more dirt road traffic would worsen the problems. It is difficult to quantify the effects of population on fugitive dust generation from dirt roads. This impact assessment adopted a reasonably conservative one-to-one relationship between population increase and fugitive dust generation from unpaved roads. On the basis of this assumption and the expected three-fold increase in the area's population, two-thirds of existing dirt roads must be paved to meet the secondary particulate NAAQS in the year 2005. No mitigation, however, has been committed to.

41-8 The analysis of a reduced production scenario would require detailed information on emission and control technology that would only be known at the PSD stage.

41-9 Problems with permitting the proposed tar sand facilities are possible. The low production scenario considered in the Regional EIS comes close to meeting NAAQS. Thus the Sunnyside STSA production level must be less than 30,000 BPD before the NAAQS can be met. How much less than 30,000 BPD is not known. A reduced production scenario was beyond the scope of this analysis. An analysis of that type would require detailed information on emissions and control technologies. That degree of detailed analysis will be conducted at the PSD permit stage.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-10 The details of these impacts will be evaluated after detailed plans of operations are submitted.

Existing regulations requiring runoff from disturbed areas to pass through sediment ponds will reduce the predicted short-term impacts. Successful reclamation as outlined in Appendix A-7 could benefit water resources. The reductions in sediment as a result of streams passing through sediment ponds should not be affected by larger or smaller runoff flows. Thus, project-caused sediment in streams would not exceed state standards, and no timeframe analysis was conducted for this EIS. Section 4.B.1, Monitoring Requirements, has been revised to include coordination with the Bureau of Water Pollution Control.

41-11 Neither the mine nor the plantsites would generate large amounts of solid waste except for overburden and spent sand. The small amounts of solid waste that would be generated can easily be disposed of in the mine overburden or spent sand disposal piles and meet all state and local laws.

The text in Sections 3.A.2, 3.B.2, and 3.C.2, Socioeconomics, has been changed to address the issue of solid waste generated by population growth.

41-12 None of the companies have proposed the use or generation of hazardous waste, and to the best of our knowledge no hazardous wastes will be used or generated. The definition of hazardous wastes and their treatment and disposal requirements can be found in Section 3005 of the Resource Conservation and Recovery Act of 1976, 42 U.S.C., Section 6925; 40CFR Parts 122, 124, 260-267.

41-13 See response to comments 1-1 and 1-2.

41-14 See response to comment 3-2.

41-15 See response to comments 3-1 and 3-2.

41-16 See response to comment 41-10.

41-17 See response to comment 3-5.

41-18 Prepareed many years before project implementation and necessarily based on preliminary project data, an EIS of this type is not designed to provide the kind of detailed impact estimates needed for developing mitigation plans. Too many changes will occur before the project comes into being to make such detailed estimates valid at this time. The function of the EIS is to sound an early warning and to provide orders of magnitude that can be used to lay the groundwork for later preparation of specific mitigation plans.

41-19 See the spent sand disposal in Section 3.A.3, Soils and Vegetation, for a more detailed discussion on spent sand handling and reclamation. Also see Table A-7-1 (Appendix A-7) for the Erosion

RESPONSES TO COMMENT LETTER 41 (Continued)

41-19 Cont. Control, Reclamation and Revegetation Program checklist for processed tar sand disposal area reclamation.

41-20 BLM agrees with your comment. All references to the coal unsuitability criteria have been removed from Section 1.D, Partial Conversion Alternative and/or Special Mitigation.

41-21 BLM agrees with your assessment, and a statement of the importance of watering sources to wildlife has been included in Section 1.D, Partial Conversion and/or Special Mitigation.

41-22 BLM agrees with your comment, and Section 3.A.1, Water Resources, has been revised to reflect your new data.

41-23 See the aquatic wildlife discussion in Section 3.A.4, Wildlife, for a discussion of the effects of siltation on the STSA's trout fishery.

41-24, 41-25, 41-26 The error on Map 3-1 is discussed in Section 3.A.1., Water Resources, of the final EIS. The error has not been corrected on the map because Map 3-1 is not being reprinted.

41-27 Section 3.A.1, Water Resources, has been revised accordingly.

41-28 See Section 4.A, Site-Specific Mitigation, Water Resources, for a discussion of mitigation measures to protect special watershed management areas. Such details will be required with the detailed plans of operations.

41-29 More paragraphs have been added to Section 3.A.1, Water Supply and Salinity Impacts, to include your new data.

41-30 Section 3.A.4, Wildlife, has been rewritten to include a discussion of the need for more wildlife law enforcement.

41-31 Specific estimates of law enforcement and other infrastructure impacts are included in Table 4.20-4.23 and 5.17-5.20 in the Final Socioeconomic Technical Report (Argonne National Laboratory 1984). Those tables were not completed in time for publication of the draft technical report.

Estimates of the impacts to infrastructures were based on standards developed by the State of Utah (see Socioeconomic Technical Report). Because existing excess capacity was not taken into account, the analysis represents the worst case. The omission of excess capacity, however, makes an adequate fiscal analysis impossible. Providing quantified impact estimates allows local planners to determine the actual impact significance for their areas.

41-32 Additions have been made to Table 3-8 and to the text in Section 3.A.2, Socioeconomics, to cover these concerns.

41-33 The discussion of quality of life in Section 1.A.2, Socioeconomics, has been changed to address this issue.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-34 See Table 3-10 to compare percentages of riparian vegetation disturbed to total riparian vegetation within the STSA.

41-35 More time will be needed for shrubs and trees of this vegetation type to recover. Section 3.A.3, Vegetation, has been revised to include these time estimates.

41-36 The paragraph in the reclamation section of Section 3.A.3, Soils and Vegetation, has been reworded.

41-37 A change in plant diversity would not necessarily result in eliminating a species, but less diversity might make an area somewhat less desirable than at present. On the other hand, new habitat could be created for other species.

41-38 Table A-7-1 (Appendix A-7), Erosion Control, Reclamation, and Revegetation Program Checklist--Processed Tar Sand Disposal Area Reclamation Section, lists recommended agronomic measures.

41-39 The wildlife significance criteria in Section 3.A.4, Wildlife, have been reworded to address this comment.

41-40 See Section 3.A.5, Recreation Resources, for a discussion of increased hunting and fishing pressure and reduced quality and success.

41-41, 41-42 The paragraph in Section 3.A.4, Wildlife, has been changed.

41-43 See Grassy Trail watershed in Section 3.A.1, Water Resources, for a discussion of increased sedimentation and turbidity. Section 3.A.1 also discusses sedimentation for each watershed. See Table 3-2 for a summary of watershed impacts.

41-44 See Section 1.A.5, Interrelationships, for a discussion of interrelated projects. In this EIS, leases were compared on a herd unit basis because all data gathered by the Utah Division of Wildlife Resources (UDWR) is based on herd units that do not correspond to STSAs. UDWR studies of crucial habitats are aimed at the total year-round habitat, which is encompassed by the herd unit, not the smaller STSA. Some crucial habitats could occur entirely withhin the STSA, but no such data now exists. Thus, comparing losses on a herd unit basis is more biologically correct than comparing losses in just the STSA. Your figures are correct for losses of seasonal ranges in the STSA.

41-45 Your statement is correct, but, in the absence of data or maps showing which portions of the seasonal habitats are used at different times, the only apparent way to analyze impacts is to assume even distribution while realizing the limitations and implications of the assumption. With our current data we do not know all of the potential impacts.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-46 See study descriptions in Appendix A-4, Uncommitted Mitigation Measures, for a listing of studies that should be conducted to furnish crucial missing data. Such studies include location of fawning/calving grounds, migration routes, and seasonal ranges. More environmental studies will be needed to assess impacts when more detailed plans of operations are submitted.

41-47 The Sunnyside EIS assumes the worst case (see Development Assumptions, Section 1.C.2) on habitat disturbance. Also see response to comment 41-45.

41-48 See response to comment 41-44.

41-49 The paragraph on the elk herd has been revised in Section 3.A.4, Wildlife, to more clearly state your concerns about the newly established elk herd.

41-50 This statement has been corrected in the big game discussion of Section 3.A.4, Wildlife.

41-51 See response to comments 41-24, 41-25, and 41-26.

41-52 See response to comments 41-24, 41-25, and 41-26 and Section 3.A.1, Proposed Action, Water Resources, for a discussion of water resource impacts referred to in the reptile and amphibian discussion of Section 3.A.4, Wildlife.

41-53 You are correct; the figures in Section 3.A.4 have been changed.

41-54 Brook trout have been deleted from the aquatic wildlife discussion of Section 3.A.4, Wildlife.

41-55 The paragraph in Section 3.A.4, Wildlife, has been reworded.

41-56 The paragraph in Section 3.A.4, Wildlife, has been rewritten to include trout fishery.

41-57 Additions have been made to the aquatic wildlife discussion in Section 3.A.4, Wildlife.

41-58 BLM's Utah State Office will require that an approved mine plan be submitted before it will issue any right-of-way. Therefore, the company must address all deficiencies noted in Table A-7-1.

41-59 The mitigation presented for the exploration and pilot phases would preserve wildlife and wildlife habitats during these operations until the pilot phase determines the feasibility of a commercial operation. The EIS analysis presents the impacts to wildlife and wildlife habitats from commercial operation, which would destroy habitat and cause a loss of wildlife on the commercial mining site. No mitigation has been proposed for the period of commercial mining except for rehabilitation at the end of mining. Also see response to comments 43-2 and 43-4.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-60 See response to comments 41-24, 41-25, and 41-26.

41-61 See response to comment 38-40.

41-62 You are correct. The paragraph in Section 4.C.1, Unavoidable Adverse Impacts, Proposed Actions, Wildlife, has been changed.

41-63 The suggested measure is mitigation that would reduce adverse impacts.

41-64 Projected impacts of commercial development are discussed in Section 4.C, Unavoidable Adverse Impacts, Wildlife. Also see response to comment 41-67.

41-65 The reclamation sequence (Figure 1-9) allows for a systematic reclamation program for lands to be concurrently reclaimed with land disturbance. This sequence, as shown in Figure 2-1, allows enough time to establish understory vegetation (grasses and forbs). More time would be needed for trees and shrubs to recover and provide for productive wildlife habitat. Thus, more than 25 percent of an area would be removed from wildlife habitat. A reclamation program that is more concurrent with land disturbance allows less area to be subject to high erosion hazards, reduces sediment, and provides for a more rapid establishing of understory vegetation. Actual reclamation techniques will be specified on a site-specific basis and will be detailed when mine plans are submitted for the commercial phase of the projects. The comment recommendations will be considered at that time.

41-66 The study description--Sage Grouse Strutting Grounds--in Appendix A-4 has been changed to state these concerns.

41-67 The terms committed and noncommitted are used by the Council on Environmental Quality, the Department of the Interior, and BLM throughout their National Environmental Policy Act guidance. Committed means that the agency requiring the measure will ensure that it becomes part of the authorizing document and will take steps to see that the measure is implemented. Therefore uncommitted means other potential mitigation that lacks committment by agencies or applicants.

41-68 See response to comment 33-2.

41-69 The paragraph in Section 1.D, Partial Conversion Alternative, has been reworded to reflect your concerns.

41-70, 41-71 The EIS purposely does not assess any site-specific impacts for a right-of-way grant crossing Desolation Canyon WSA because no right-of-way applications have been filed. When such applications are filed, BLM will evaluate impacts on a site-specific basis.

41-70, 41-71 Cont. Regarding water facilities on the Green River for tar sand development, we are aware of various water filings to the State Water Engineer. BLM has formally protested these filings by Sunnyside applicants on the basis of current unresolved wild and scenic river designation of the Green River, wilderness suitability for Desolation Canyon WSA, and known archaeological resources at filing locations. Applicant plans of operations for lease conversations do not provide enough site-specific data to allow a definitive evaluation of effects.

Nevertheless, Section 3.A.5, Recreation Resources, points out the potential for adverse, significant impacts upon future designation and user experiences. As stated above concerning rights-of-way crossing Desolation Canyon WSA, once applicant projects and water filings are better defined, the site-specific impacts of diversion structures and related facilities will be evaluated in an environmental document. BLM would approve or disapprove facility construction on the basis of the nonimpairment policy for WSAs and unresolved wild and scenic river designations.

41-72 Mitigation measures committed to by the applicants or required by existing laws and regulations would reduce the potential to exceed state water quality standards during operations. Successful reclamation as outlined in Appendix A-7 could improve existing water quality. Stipulations on levels of development to meet environmental laws and to provide environmental protection will be attached to converted leases. Federal, state, and local regulatory agencies will ensure that violations will not occur.

41-73 Section 3.A.5, Recreation Resources, has been changed.

41-74 The comment has been noted, and the paragraph in Section 3.A.5, Recreation Resources, has been deleted from the text.

41-75 The sentence in question on page 3-69 of the draft EIS concerning effects of "new comers" has been deleted from the text.

41-76 Current land use plans do not provide for tar sand development. Some amendments are needed to these plans to protect the environment from impacts unforeseen when the land use plans were formulated. See the Utah Combined Hydrocarbon Leasing Regional Final EIS (BLM 1984) for categories to establish amendments to current land use plans.

Changes have been made to Sections 3.A.12, 3.A.5, and 4.D.

41-77 The Socioeconomic Technical Report (Argonne National Laboratory 1984) and Section 1.A.5, Interrelationships, have been revised. The interrelated projects list excludes new coal mines included in the coal lease tracts. The North Horn Mountain lease tract and other proposed coal developments of similar status were removed from the analysis. The list of interrelated projects was provided by the Utah Office of Planning and Budget.

RESPONSES TO COMMENT LETTER 41 (Continued)

41-78 The table did show the level-of-service after applicant-related increases had been added, but the heading for this category was incomplete. It has now been changed to read "Level-of-Service for Project and Projected Baseline."

41-79 This comment is mentioned under uncommitted mitigation measures in the draft EIS as measure 2 on page A-4-4, Transportation Networks.

41-80 The road going through Nine Mile Canyon has the correct Carbon County road number--381 not SR 53.

The road number is correct. It is not listed as SR 53 but Carbon County Road 381. The change requested for page 3-67, line 5 is not on page 3-67.

41-81 See response to comment 41-31.

41-82 See response to comment 33-70.

Comment Letter 42

UTE INDIAN TRIBE

UINTAH AND OURAY AGENCY

Fort Duchesne, Utah 84026

In Reply:

February 1, 1984

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P. O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

The Ute Indian Tribe, Uintah and Ouray Reservation, Utah, appreciates the opportunity to provide comments on the Sunnyside Combined Hydrocarbon Lease Conversion draft EIS. Review of the document and appropriate comments have been prepared and presented to the Ute Tribal Business Committee by Ute Resource Division staff and the Council of Energy Resource Tribes.

The most recurring phrases presented by reviewers is "the lack of" and "the need for further assessment of" various major components essential to address in an environmental impact statement. It does not seem practical to assess even phased development, or consider land use planning without first assembling all
42-1 pertinent data for incorporation into an EIS document. Further, the "phased development" scenario should be defined within this document to assure the complete protection of the environment.

42-2 We, again, must emphasize to the Bureau of Land Management that the Ute Indian Tribe is a federally recognized soverign government with the authority and ability to provide a stable future for the Ute people. This fact must be included in EIS documents along with the distinct difference of Indian land vs. federal land, and the government or agency responsible for that property. We are concerned that the "building process" of information about Ute lands for EIS documents has not occurred.

We do appreciate the opportunity to interact with the Bureau of Land Management in the developmednt of energy resources and protection of the environment. Further, specific comments and line item statements are herewith attached and enclosed for the attention of the BLM. We look forward to a continued and strengthened relationship with the Bureau of Land Management.

Respectfully,

UTE TRIBAL BUSINESS COMMITTEE

Floyd Wopsock

D. Floyd Wopsock, Chairman

INTRODUCTION

The Sunnyside Combined Hydrocarbon Lease Conversion Draft Environmental Impact Statement (DEIS) addresses five proposed oil and gas lease conversions within the "main block", or southern portion, of the Sunnyside Special Tar Sand Area (STSA) in Carbon County.

The Ute Tribe recognizes the development potential of hydrocarbon resources in Sunnyside, as well as other special tar sands, areas of Utah. The Tribe also recognizes that some degree of experimentation with tar sand development must be authorized to help fill information needs and that a level of development must be authorized if we and our neighbors are to continue to enjoy this part of the country, our homeland and a base for our way of life. Integral to our enjoyment of our homeland is protection of environmental resources: the air, the water, the fish, the wildlife, the land, and the setting. Thus we appreciate this opportunity to continue our involvement in evaluating tar sands development on areas surrounding the Uintah-Ouray Reservation in terms of its direct, and indirect effects on the Ute Tribe.

Our reviews of the various phases of the Combined Hydrocarbon leasing program have been multi-faceted, with all disciplines involved. The information presented in the DEIS is broadly based and represents the degree anticipated at an early stage of an evolving technology. The incompleteness of resource inventories, coupled with the unanswered questions regarding "environmental residuals" or impacts of tar sands development, make it difficult for us to properly advise the Department on the preferred approach in this multi-faceted program. On the one hand we wish not to delay development in order to obtain inordinate amounts of data. On the other hand, we do not wish to advise proceeding with a long-term commitment where there is a high risk that the necessary environmental protection associated with that commitment cannot be assured.

In the DEIS for lease conversions in the Sunnyside Special Tar Sands Area, it is noted that

> "Approval of the conversion applications would permit phased development of the tar sands resource. Because very little is known about the location and extent of the resource, project designs are conceptual. Therefore, should a lease be converted, additional site-specific environmental analyses would be required before the types of commercial production addressed in this environmental impact statement (EIS) would be permitted" (p. S-1).

42-3 We agree in large part with this statement. However, we recommend that approvals be phased to allow substantial decisions regarding the environmental acceptability of tar sand extraction and upgrading in the Sunnyside area to be made in a step-wise manner. We believe it is premature to commit to all extraction proposed in the Sunnyside area at this early stage of the process.

42-4 The Ute Tribe has concern that water and product pipeline routes and electric transmission line routes are not discussed in the DEIS. These routes, if proposed for Uintah-Ouray Reservation lands, or other sensitive areas, can have adverse impacts on local environment in the affected areas.
42-5 The Ute Tribe is similarly concerned that no discussion of refinery capacity for the projected production is present in the DEIS. We understand the BLM's portion (p. 1-24). We remain concerned that pipelines and increases in refinery throughout will have additional reports on water uses. If the tar sands production is to replace more conventionally-produced crude supplies, adequate justification of this concept should be provided.

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42-6 It is important to recognize, for any developments, that the Ute Tribe is a separate and distinct geopolitical entity which controls its own natural resources and that they can exercise far greater control over their own culture, economy, governments and environments. Therefore, we believe the tribe should continue to be involved in the tar sands development program, including the resource-by-resource assessments that lead to designation of exploration procedures, pilot facility designs, and commercial facility designs. Also, we recommend that technical meetings be held such as the air quality technical sessions prior to the publication of the draft Utah Combined Hydrocarbon DEIS document. Most of the air quality issues raised by the tribe at these meetings were addressed. By being involved, the tribe will be better able to deal with critical and sensitive areas of concern.

WATER RESOURCES

In both the Sunnyside and Regional Analysis, the production level for the STSA was 115,000 bpd. The Regional Analysis also recognizes 10,000 barrels per day from one development on private lands. Estimated water requirements for the federal actions in the Regional analysis were 36,145 af/yr, and slightly less for the Sunnyside analyses (35,845 af/yr).

The Sunnyside DEIS also analyzes production scenarios of 80,000 and 50,000 bpd, requiring an estimated water supply of 20,738 af/yr and 14,340 af/yr, respectively. These scenarios assume (1) conversion of only a portion of the lease area or "partial conversion" and (2) utilized development of the entire area proposed for lease conversion (BLM's "preferred alternative" but BLM states that no authority exists to require the unitized development).

It should be noted, and is relatively well addressed in the DEIS (Sunnyside), that each of the four watersheds involved in the proposal has a substantial number of springs, special watershed management areas, high water quality, and some cold-water fishery. The effect on surface water flows for the three scenarios projected through the DEIS is shown on Table 1. The water use projections mesh with the Regional Analysis (Volume 1). The percentage reductions in streamflow are significant for the smaller drainages.

The tar sands resource is poorly defined in the Sunnyside STSA (pp. S-1, 1-23). In part due to this poor definition, the projections of impacts to water quality are not accurate since the hydrogeology of the geographical locations of potential development is not well known.[1] While the BLM is to be complimented in producing a useful compilation of data, and while the DEIS is an improvement, in terms of the quality of information, over the regional DEIS, the resulting document, the Draft EIS for Sunnyside Combined Hydrocarbon Lease Conversion, provides an inadequate basis for recommending a level of development based on the acceptability of hydrologic effects. The risks of having serious adverse impacts occur to streamflow and quality appear sufficiently high (pp. 3-4, 3-5, 3-6) that a better, quantitative understanding of the effects of tar sands development should be developed to give the decision-maker adequate basis to evaluate competing resource priorities prior to full scale development. We believe "phased development" offers an opportunity to save this dilemma.[2] The DEIS (p. 1-23) states the analyses were of worst-case situations as a result of the assumptions. There may have been too many assumptions to be certain the analyses presented are of worst-case situations. There is also the distinct possibility that adverse impacts, especially to shallow groundwater and surface water systems, may be over-estimated as a result of the apparent lack of hydrogeologic data. 42-7

42-8 In this regard, the least adverse impacts and greatest opportunities to avoid conflicts

[1]DEIS, Vol. I, Regional Analysis, p. 51: "Test points are so widely spaced that the distribution of portions of the STSA most amenable to tar sand extraction by surface mining or in-situ methods are speculative, except near Bruin Point (USDI, MMS, 1982)." Also, p. 1-1 Sunnyside DEIS: This poor definition is not unique to the Sunnyside STSA, it exists almost everywhere.

[2]"Phased Development" is explained on Page 7 of this document. It appears to correspond to the step-by-step" approval process outlined by BLM on p. 1-7. However, there must be adequate authority to reject plans, in their entirety, if adequate environmental protection is not provided.

Table 1

CHANGES IN WATER FLOW AND QUALITY

(5 Lease Conversions) [a]

Measures of Water Resources Impacts	Alternatives Considered	Range Creek	Price River	Green River[b]
Annual Water Use ac. ft.	1. Proposed	5000	16500	14345
	2. Partial Conversion	0	12000	8738
	3. Unitized Devel.	0	14340	0[c]
Percent Reduc-	1. Proposed	100	22	1
	2. Partial conversion	n/a	16	1
	3. Unitized Devel.	n/a	19	1
TDS Change	1. Proposed	"large increase"	"little or no change"	"/mg/1"
	2. Partial Conversion	"little or no change"	"little or no change"	"/mg/1"
	3. Unitized Devel.	"little or no change"	"little or no change"	"/mg/1"

a Does not include related action.

b Not including Price River. Add 3 columns to obtain total depletion of Green River at Green River, Utah.

c Assumed. Table 3-38 states 14340. Since this amount is also the total withdrawal for the Unitized Development Scenario, it must be apportioned between the Price and Green Rivers.

42-8 (cont.) occur under the unitized Development Alternative. We support the request that coordination to achieve appropriate watershed management procedures be required (p. A-1-3). However, the 19 percent reduction in flow in the Price River accompanying this alternative still appears to be very significant (p. 3-96). We are concerned over this substantial depletion and feel the impacts of this depletion have not been adequately evaluated. For that matter, the 16 percent reduction anticipated with the partial conversion alternative also appears very significant (p. 3-71). What are the alternatives to this significant impact on the Price River.

It is possible that the results of exploration and pilot mine development on tracts should be the basis to make decisions regarding the acceptable scale of commercial development. It would appear possible to proceed with lease conversions if there were a clear understanding with the lessee that exploration, test mines, pilot plants, and commercial-scale operations were each subject to sequential reviews, each of which could lead to rejection of plans based on decisions regarding resource tradeoffs and using the improved data base developed during each stage. This is the "phased development" noted earlier.

42-9 We are concerned about the potential adverse effects of tar sands development in the STSA on water resources. First, the flow and salinity model used to project impacts is excellent to assist with regional comparisons - it is not of value in assessing the local effects on tributary streams, or on Tribal and other nearby lands. In this context we again underscore the projection of a 28 percent reduction in flow in the Price River (p. 5-2). This appears to be unacceptable. It is implied further that all flow from Range Creek would be utilized (p. 3-8). We do not believe the effects of this projected withdrawal have been clearly described.

42-10 With regard to the use of simplified consumptive water use models, we recognize, as did the authors, that relatively high Total Dissolved Solids (TDS) concentrations exist in the Price River (p. 3-8, DEIS, Sunnyside) and that water depletions from headwaters will have less adverse effect than on Range Creek or Grassy Trail Creek (pp. 3-1 through 3-8). While this type of impact when accurately projected, should be used to rank sites for development and to identify the need for effective mitigation measures, the analysis is deficient in that it does not address the potential for increased salt loading after mining and reclamation [3].

42-11 It is not clear what assumptions were made regarding organic or metal contaminants from coke produced at the three bitumen upgrading facilities. If these impacts were ignored in the water quality modeling, we believe the projections need to be revised, or special mitigation measures developed because we believe containment will be difficult and that migration of leachates is possible.

The Tribe is especially sensitive to the DEIS discussion of the tributary streams affected by the proposed operations questions (pp. 3-4 through 3-7). In particular, we share concerns over destruction of public water reserves, water supply reserves, springs, and the trout fishery within Rock and Range Creeks. Comparison of Tables 3-2 and 3-26 indicate that the BLM is considering further protection of these values by proposing to move operations into somewhat less sensitive areas. It is unfortunate that the Unitized

[3] If data exists to confidently predict that there will be no leaching of replaced overburden, or of fractured confining strata, then those data should be made available such that the Tribe may reexamine the predictions of water quality projects in a different manner.

Development Alternative has not been able to take this approach. A table should be added to the DEIS to show the effect of phased (Unitized) development on these sensitive

42-12 resources. The Tribe does support the protection of the special management areas noted on page 1-9. We believe protection can best be afforded through a better description of the hydrologic system and better projections of future development-related impacts. In view of the potential significance of projected impacts of the proposed conversions on Grassy Trail Creek (p. 3-4), Range Creek (p. 3-5), Nine Mile Creek (p. 3-6), and other tributaries to the Green River (p. 3-6), we believe that is it imperative to employ the restrictions applicable to Special Management Areas (pp. 3-6 and 3-7, Map 1-5), until an adequate, quantitative, and technically-accurate understanding of the surfacewater and groundwater effects of mining and reclamation is available to the decision-makers and affected public. If a better description of the hydrologic system of the Sunnyside STSA is available, it should be issued as an additional volume of the DEIS.

42-13 With respect to wilderness study areas, particularly the Desolation Canyon WSA, water quality and quantity analyses must specifically identify affects on streams tributary to the Green River. Management decisions must protect the wilderness quality of these areas. We must be assured the protective measures are feasible and effective (and enforceable).

42-14 The DEIS lacks an analysis of the shallow and moderately-deep groundwater system including the identification of the mechanism of springs and quantification of base flows (recharge-discharge relationships) of the more important streams. This is required to assess the recharge-discharge impacts of the alternatives as well as to contribute to the quantification of salt-loading from mined and reclaimed areas.

42-15 Also of concern to the Tribe is the need for an improved description of the anticipated stratigraphic and structural controls on the in-situ operation proposed. What are the permeability characteristics of the confining beds, including their extent after possible reservoir stimulation or well development? Are there oil reservoir data that may be used to derive the anticipated characteristics? Do the answers (or lack thereof) to these questions reflect a need for specialized monitoring to provide a basis for extrapolation? The Tribe also stresses that hydrologic testing and monitoring should be mandated for many development or exploratory drill holes. This will avoid the continuing problem of obtaining adequate groundwater data at a mine plan stage. The applicant's commitments to this monitoring appear quite vague. Review of the applicant's proposals for geohydrologic monitoring, as summarized in Table 4-1 (p. 4-4 of the DEIS), indicates that the actual monitoring and investigation proposed cannot be determined at this time because it is too vague. It will be extremely important to mandate a strong, yet economic, monitoring program and to ensure the data are available to affected parties and decision makers. (In this same context, as well as in the case of proposed in-situ operations, care must be exercised to prevent adverse intercommunication between strata, both during operations and after operations are completed.) There is note made in the Regional DEIS that some holes will be abandoned in conformance with Utah's requirements. Care must be exercised to prevent adverse intercommunication between strata, both during operations and after operations are completed. The specific requirements of Utah's regulations should be identified in this DEIS.

With further reference to in-situ operations, and with reference to some open pit mining, if confining beds exist above or below (in close proximity) the tar sands zone and are substantially fractured, intercommunication between zones will occur. It is not clear from the DEIS whether upward flow from confined aquifers below the mine zone, or downward leakage from strata above the mine zone, can be expected since the potentiometric surfaces of aquifers are not discussed. It would appear that, since springs

exist, some confined, saturated strata exist. While potential interruption, if not destruction, of certain springs is predicted in the DEIS, the possibilty of more pervasive effects of mining on groundwater, area-wide changes in the potentiometric surface or mining of waters of different water quality, is not addressed. The focus of our question

42-16 is to request definitions of the site-specific impacts of such aquifer interconnection on water quality and water availability prior to approval of commercial-scale development. The summary statement on p. S-2 begins to address this concern, but is confusing. The text at p. 3-4 adds to our understanding, but remains quite general.

42-17 On pages S-2 and 3-38 of the DEIS, it is suggested that warmer water may be discharged to the perennial streams. In order to make informed decisions regarding resource development, the quantitative basis for this statement should be made available and the impacts on beneficial use of water identified.

42-18 We would like to know what considerations entered into the proposals to place spent sand on lands outside the STSA. It is not clear what resource tradeoffs may occur if off-site placement is allowed. It is not clear as to the mechanism the surface and mineral owners will use to allow this land use. In relation to our assessment of the effect on water

42-19 resources, we do not find any compelling evidence that assures us that these disposal piles will be stable, especially as they are proposed to be placed in valleys across drainage channels. (It is noted that some spent sand piles do seem to be proposed for headwater locations where stabilization may be easier.) We believe this may be a more substantial issue in need of further assessment, rather than the relatively cursory identification currently provided in the DEIS. It appears that those areas designated (in

42-20 the DEIS) for spent sand disposal are outside the STSA. Thus no tar sand leasing categories (oil and gas leasing categories also?) are addressed in the Regional DEIS - Volume 2 (which presents the land use leasing category proposals). This appears to be a serious inconsistency.

The Sunnyside DEIS specifies that mitigation measures will include those proposed by applicant and those specified (as standard) by land and mineral management agencies. Additional mitigation measures are proposed in the DEIS for consideration. With respect to water resources, the mitigation measures consist of those summarized in Table A-7-1 of the Appendices, Appendix A-3, Chapter 4 (p. 4-1), and those proposed in Appendix A-4. These measures are principally erosion control. They reiterate valid steps one should take to control sedimentation in receiving waters. One stipulation does begin to address the geohydrologic data issue in the control of the Sunnyside Water Supply Reserve and Public Water Reserves. That mitigation measure, described on page 4-1, begins to direct future efforts in what we envision as the proper measures since it requires:

> "To protect important aquifers, all surface and in-situ mining will be preceeded by complete hydrological testing and evaluation. Analysis of springs or reduction in perennial streamflow will be replaced with water of an equal quantity and quality."

42-21 We stress the need for these data prior to approving full-scale development. We believe the lease requirements should be better tailored to sites and should allow the phasing of both data collection and development decisions. This phasing consists of requiring adequate groundwater and surface water data to be submitted prior to (1) exploration, (2) pilot facility design, and (3) commercial facility design in order that water resource and tar sand resource priorities, along with mitigation measures, can be determined, based on adequate data. As noted earlier, this "phasing" is not unlike the procedures suggested by BLM on p. 1-7. However, the step-by-step approval process must be given adequate authority to reject plans at any stage if hydrologic and other environmental protection

42-22 measures are determined to be inadequate. It is suggested the criteria to be used to judge inadequacy be contained in the leases such that lessees can have as clear as possible an understanding of their responsibilities and the expectations of the decision makers. In this context, we take exception to the tentative adverb "could" that modifies certain plans for hydrologic monitoring (e. g., pp. 1-26 and 1-29). The monitoring should be required.

The DEIS states that unresolved issues such as watershed impacts need to be pursued and should be subject to further discussion, coordination, and action (p. 5-5). The tribe would appreciate opportunities to participate in these coordinated discussions.

SOCIOECONOMICS

42-23 The assessment of potential socioeconomic impacts from the Sunnyside STSA presented in this document is in need of substantial revision. The following is a list of the minimum requirements needed to complete competently the assessment of socioeconomic impacts in the region:

- treatment of the Uintah-Ouray Reservation as a separate geopolitical entity within the study region;
- an evaluation of the potential impacts on population and employment that Sunnyside is likely to have on the reservation; and
- the effects of this growth on the following facilities and services within the reservation.
  - housing,
  - tribal government,
  - police and fire,
  - schools,
  - water and sewer, and
  - solid waste.

The only reference made by either the Draft EIS or the accompanying Socioeconomic Technical Report to the Unitah and Ouray Reservation and the Ute Indian People, is a brief description of the existing baseline socioeconomic conditions and the attitudes of tribal members to energy development. In contrast, Carbon and Emery counties and their subordinate jurisdictions and special districts were accorded individualized treatment. The effects on their available infrastructure and fiscal balances were evaluated quantitatively.

The Unitah-Ouray Reservation is a separate, distinct, and soverign entity located within 10 miles of the northern reaches of the Sunnyside STSA. The failure of this document to address the potential socioeconomic impact of the project on the reservation is a gross oversight that could have been avoided. This document will not be complete until an assessment of the socioeconomic impacts on the reservation and the Indian population is completed in a manner consistent with the standards used in assessing the impact of other smaller jurisdictions in the region. It is strongly recommended that this process, which may take up to 6 months to complete, begin immediately.

Specific Comments:

	Page	Paragraph	Comments
42-24	3-9	6	The counties and communities selected for inclusion in the EIS were those whose projected population impacts exceeded 5% as estimated by the UPED Model. This selection criterion raises several interesting question: o Given the fact that UPED is unable to recognize the reservation as a unique jurisdiction, how was it evaluated with respect to the population criterion? o What were the projections of population within the exterior boundaries of the reservation? o Why was the UPED Model, which focuses on traditional county and subcounty entities, used to evaluate regional socioeconomic impacts?
42-25	3-12	3	It is stated that if the impact on public and human services were 10% greater in the peak construction year than in the corresponding baseline year, the impact would be considered significant. o Was this evaluation conducted for tribal fiscal balances? o How? o What were the results?
42-26	3-12	3	It is also stated that impacts were regarded as significant if net fiscal balances were more than 5% negative. o Was this evaluation conducted for tribal fiscal balances? o How was this done? o What were the results?

It appears likely that the selection criterial used for counties and communities in the region was not applied, in the same quantitative manner, to the reservation. If this is so, substantial work remains to be done to complete this document. If it was, the information necessary to meet the criticisms outlined in the preceding General Comments Section should be available. If available, these results should be presented either in the DEIS or accompanying Socioeconomic Technical Report. Ignoring completely as these documents do currently, any consideration of potential impacts on the reservation and Indian population that so closely border the Sunnyside STSA is unacceptable.

SOILS AND VEGETATION

The level of detail on soils and vegetation is quite general and broad. Information from applicants was used to a minor extent. Third order soil surveys do not provide enough details to accurately determine soil properties. Soils and vegetation maps (not provided) at the scale of 1:240,000 are not detailed and defined enough to be accurately applied for site-specific purposes. The use of limited data to establish baseline conditions is questionable. Additionally, the preparation of a reclamation plan from scant data would be difficult. However, the EIS discusses reclamation programs, reclamation guidelines, plan evaluation, checklist (TABLE A-7-1), and analysis quite well. The lack of data limits an adequate evaluation.

	Page	Paragraph	Comments
42-27 42-28	5-1	2	Scant information was available that could be utilized to prepare this EIS. The combined hydrocarbon lease conversion will pose some considerably significant impacts. Therefore, the decision to convert a lease should be justified by expanding discussion on why utilization of limited data supports such a decision. It is suggested that more of the applicants' information be incorporated into the EIS.
42-29	1-1	2	A converted lease will be subject to an additional environmental assessment prior to permitting. In the interest of streamlining the NEPA and permitting processes, the Final EIS should be expanded to include more detailed site-specific disucssion, thus, precluding additional environmental assessments.
42-30	1-4	2	Considerably more information is needed to determine if the proposed plans of operations are deemed adequate and acceptable. Until sufficient information can be obtained can that determination be made.
42-31	3-1	4	The "D" in "Section 1.D.2" should be changed to "C".
42-32	3-25	7	Chemical and physical properties have to be determined to become a basis for predicting the potential impacts spent sands will have on revegetation. When will test results be available?
42-33	3-26	4	The use of a 1:240,000 soils and vegetation map provides very limited detail that is desired in an EIS. Conventionally applicants provide detailed baseline information. The EIS should use information gathered by the companies.
42-34	4-1	7 (#5)	This paragraph should be deleted, since disturbance at any one time will be less than 25% of the affected area.
42-35	4-4	Table 4-1	Review of TABLE 4-1 indicates a low level of information gathering on the part of the companies. In light of this fact it seems premature to publish this EIS at this time.

	Page	Paragraph	Comments
42-36	4-5	1	"Baseline information for reclamation is very complete." As stated discusses only the 3rd order soil survey. A more detailed discussion of soils and vegetation would be appropriate.
42-37	A-7-1	5	The assumptions listed are acceptable, however, a mere commitment to compliance and implementation of current incomplete reclamation plans does not ensure successful reclamation. The companies should submit a fully detailed plan so an adequate evaluation process can evolve.
42-38	A-7-2	1	The use of a 3rd order soil survey is too general to "accurately assess local conditions and potential for reclamation success." A detailed survey would more accurately make such an assessment.
	A-7-16	3	Appendix A-7 presents a good discussion on reclamation programs, guidelines, evaluation of applicants' plans, checklist (TABLE A-7-1), and analysis. However, applying the aforementioned items to the limited baseline data and applicants' information presents a difficult evaluation process. Sufficient information would comfortably support assumptions as well as provide defense. The lacking data is evident in the numerous omissions indicated in TABLE A-7-1.

WILDLIFE RESOURCES

The description of the affected wildlife and their habitat was too general. For example, vegetation mapping was done on a scale of 1:240,000 (p. 3-26). Also, the description of the wildlife resources of the "zone of influence" should be addressed. This would include the Uintah and Ouray Reservation. Until site-specific wildlife information is collected, the potential impacts of the proposed development cannot be fully evaluated.

Specific Comments:

	Page	Paragraph	Comments
42-39	3-30	1	The statement "Adverse impacts to wildlife...were considered to be significant if more than 10 percent of the total available crucial habitats would be disturbed", fails to consider separately the value of each crucial habitat. For example, the disruption of winter range generally is more damaging than the destruction of an equal amount of summer range. How the percentage figures were computed should be included.
42-40	3-32	9	"...impacts would occur" is correctly stated. However, the statement should be carried further to say "significant impacts would occur".
42-41	3-33	Table 3-12	If the "area of influence" is the same as the "zone of influence" (p. 3-32, Paragraph 9), Herd unit 27A, 28B and 28D should be included.
42-42	3-34	1	Because deer or other wildlife species generally concentrate in certain customary use areas within their seasonal ranges or critical habitats, you cannot assume that they "are distributed equally over their available seasonal ranges". Therefore, percentage figures for habitat loss cannot be correlated with wildlife loss.
42-43			There is a significant impact if habitat disturbances occur over a 74-year period with some areas not to be returned to pre-construction production.
42-44	3-36	3	The high reproduction potential of the cottontails does not necessarily indicate that these species would quickly repopulate after reclamation is completed. These species will repopulate after their food and cover requirements, at the least, are met. For example, shrub species are excellent cover for these species. On Page 3-32, there is a discussion of how cover species may take as long as 20 years or more to become re-stabilized. In this case, these species would not repopulate quickly.

	Page	Paragraph	Comments
42-45	3-36	5	Again, the assumption that high reproductive potential indicates repopulation of reclaimed mine areas would be rapid should not be made. Also, it should not be assumed that "various species are spaced evenly within the affected area" unless this has been verified.
	3-36	8	The assumption that reptiles space themselves equally over an area should not be made.
	3-37	6	Same as above comment for grouse.
42-46	4-1	Mitigation Measure #5	The word "substantially" should be clearly defined.
42-47	4-3	Mitigation Measures #7-10	How will exploration, drilling and other developmental activities take place in areas that have sage grouse nesting site, winter range and summer range in close proximity to each other?

AIR QUALITY

The air quality components of the Draft EIS for the Sunnyside Combined Hydrocarbon Lease Conversion were reviewed. The DEIS indicates that the proposed development would have significant impact on the visibility values on the Uintah and Ouray Reservation. Ambient air quality and PSD increment standards would probably not be violated on the reservation. The document recognized the Ute Tribe's sovereignty and attempted to address most of the issues of concern to the tribe. The dispersion methodology used is acceptable; appropriately subscribing to sound scientific principles and used best available information. The following comments are made in order to resolve the remaining issues in the Draft EIS.

42-48 Although the general analysis performed is adequately performed, the modeling approach could understate maximum worst-case local ambient air quality impacts. Accordingly, the general approach used in the EIS may not be directly compatible with the existing regulatory decision process used by the EPA and state agencies in permitting air pollution sources. Also, the results of this regional analysis, using generalized short-term meteorological data, may not necessarily coincide with the results of analyses required by permitting agencies who ultimately make key air quality decisions.

An important conclusion implied from the DEIS is that the combined air quality impact of the proposed synfuel development described in the Uintah Basin Synfuels Project EIS with the Sunnyside Tar Sands development would degrade the air quality of the reservation (particularly the visibility values) and could possibly inhibit the Ute Tribe from development.

Specific Comments:

	Page	Comment
42-49	3-50	There is a slight difference in the cumulative impact for the Sunnyside proposal in Table 3-18 with that shown in the Utah Combined Hydrocarbon EIS (Table 4-2, Page 96).
42-50	3-51	The reference to nitrogen depositions on the Uintah and Ouray Reservation is confusing. Does the high nitrogen deposition rates on the Reservation mean that the potential for acid deposition could be significant?
	3-53	As with acid deposition, the greatest impacts to visibility will occur on the Uintah and Ouray Reservation. Also, these impacts are in excess of EPA recommended guidelines for Class I areas.

RESPONSES TO COMMENT LETTER 42

42-1 All known data was assembled and analyzed for this EIS. If conversion of these leases is approved, more EISs or environmental assessments will be needed before BLM can approve applications to mine.

Phased development in this document refers to the step-by-step process planned by applicants. Phased development envisions first, approval of the conversion application; second, exploratory drilling; third, the pilot plant phase; and fourth, commercial production if phases 2 and 3 prove that the resource exists and the oil can be extracted economically. Through its EIS process and application approving procedures, BLM has full authority to reject plans of operations if they are incomplete or provide inadequate environmental protection.

42-2 We recognize that the Uintah and Ouray Indian Reservation is a sovereign government entity with specific jurisdiction and responsibilities administrated by the Ute Indian Tribal Council and have stated this in Section 1.A.5, Interrelationships, of the final EIS. We have analyzed the two environmental concerns that the Ute Tribe felt could affect the reservation: air quality and recreation.

We have also evaluated other project-related environmental impacts that could affect the Reservation. We found no other impacts than the air quality and recreation because of the location, distance, and physical barriers between the Sunnyside tar sand project and the Reservation. Moreover, the operational procedures and location of the project components will not affect Indian lands.

42-3 Thank you for your comment. Your concerns will be considered by the decision maker.

42-4 See Section 1.C.2, Applicants' Plans of Operations, for a discussion of route locations as proposed. When final routes are proposed, other environmental analyses will be conducted.

42-5 The scope of this EIS is the conversion of existing leases and related development. None of the applicants proposed new or expanded refineries. Thus, on the basis of information from industry, this analysis assumed that existing refinery capacity is adequate to process crude oil from tar sand.

42-6 BLM will continue to involve the Tribe in areas of mutual concern. Also see response to comment 42-2.

42-7 Thank you for your comment. It will be considered in decision making.

RESPONSES TO COMMENT LETTER 42 (Continued

42-8 One alternative is not to convert; another is to use the Green River. Because all water in the area is appropriated, water would have to be leased or purchased. If water is obtained from existing irrigation use from the Price River, using such water for tar sand development in the STSA would have no impacts, flow in the Price River would not change, and Price River water quality would improve.

42-9 The model you refer to was used to predict the impacts of developing all tar sand in Utah. Your observation that this model is not useful in this instance is correct. Section 3.A.1, Water Resources, Water Supply Impacts, has been changed accordingly.

The 28 percent reduction in Price River flow is based on a worst-case analysis. If Price River water is used, it would be purchased from present users, and its use for tar sand development would not reduce the river's flow. If obtained from irrigators, the Price River's water quality could improve. Impacts to tributary streams will be evaluated and mitigated by stipulations when enough detail is received.

42-10 Most soils in the area contain only small amounts of salts. Table A-7-2 (Appendix A-7) shows that erosion rates can be reduced to below existing conditions. Runoff and streamflow could be improved beyond the existing quality.

42-11 These impacts will be evaluated in detail upon submission of adequate data. Wastes with organic or metal contaminants will be regulated by the National Pollutant Discharge Elimination System permitting process.

42-12 Section 3.C.1, Water Resources, analyzes impacts of the unitized development alternative. The impacts would be somewhat less severe than the impacts of the proposed actions, which are listed in Table 3-2.

42-13 Access to the Green River would require a right-of-way permit from BLM. Impacts would be assessed at that time. Additionally, BLM's Interim Management Policy (1979) would not allow impairment of wilderness study areas.

42-14 Section 3.A.1, Water Resources, has been revised to describe the changes in shallow and deep aquifers and in streamflow.

42-15 See Section 1.A.4, Authorizing Actions, which states that before on-the-ground activity is authorized, the lessee would be required to submit more data, including the kind of data you referred to in your comment.

42-16 Data does not exist but will be obtained before the approval of commercial-scale development. Both the Summary and Section 3.A.1, Water Resources, have been clarified.

42-17 Retention of runoff from disturbed areas would increase the temperature of water discharged in the summer. Removal of springs would reduce the cool ground water that feeds some streams. The temperature increase of streams cannot be quantified with accuracy.

42-18 The companies have proposed the off-site disposal of spent sand. The decision was probably based on convenience and economics. Tradeoffs are not a part of the standard EIS, but the impacts of the spent sand piles have been analyzed. Each company will have to purchase the right for offsite disposal from private owners or obtain a special use permit for BLM land.

42-19 See response to comment 27-9.

42-20 Acres designated for spent sand disposal outside the STSA were proposed by the companies, and the companies will either have to purchase the right to use the land or obtain a special use permit for the use of BLM land. New combined hydrocarbon leases will not be issued for the sole use of spent sand disposal. Under the law, combined hydrocarbon leases must be within the STSA.

42-21 Detailed background water resource data will be collected before and during exploration to enable the development of detailed plans that will either avoid or mitigate water resource impacts.

42-22 We could not find the reference to "could" in plans for hydrologic monitoring on page 1-26 of the draft EIS. Ground water monitoring is required by the State of Utah through the Division of Oil, Gas, and Mining. (See Section 4.B.1 for a discussion of monitoring requirements.)

42-23 Council on Environment Quality regulations for implementing the National Environmental Policy Act require that detailed environmental analysis be restricted to those impacts that would be significant. Insignificant impacts are to be analyzed only to the extent needed to determine significance.

Analysis using the UPED model and its spatial allocation submodels determined that significant socioeconomic impacts of the Sunnyside project would occur only in parts of Carbon and Emery counties. The Uintah and Ouray Indian Reservation would thus not be significantly affected. Geographical barriers, consisting of the Book Cliff highlands and the Green River, severely limit travel to the north and east of the STSA. Given the relative accessibility of communities in Carbon and Emery counties, a significant number of project workers would not be likely to commute elsewhere. That portion of the STSA within the Uintah and Ouray Indian Reservation is not proposed for development under any of the alternatives analyzed in this EIS.

42-24, 42-25, 42-26 The draft EIS summarizes the impacts to the affected areas that satisfy the 5 percent population growth criterion established by the State of Utah. Socioeconomic impacts on the Uintah and Ouray Indian Reservation are not addressed in the Socioeconomic Technical Report (Argonne National Laboratory 1984) because the population centers on the Reservation are not within commuting distance of the proposed lease tract developments. Environmental and land use impacts are likely to arise, but these potential effects are considered in other sections of the EIS.

Socioeconomic impacts are not likely to arise on either portion of the Uintah and Ouray Indian Reservation: Hill Creek Extension or the northern land area. Socioeconomic impacts would not arise on the Hill Creek Extension because the area (1) lies across the Green River and has no direct access to Carbon County, (2) is an uninhabited area, and (3) has been designated by the Indians as sacred grounds to be used only for hunting and religious purposes and not for development. (See Section 2.7 in Socioeconomic Technical Report, Argonne National Laboratory 1984.) Tar sand development in the Sunnyside STSA would have no socioeconomic impacts on the northern land area of the Reservation because of the area's distance from the STSA. The lack of a sufficient road network, rugged terrain, and distance prohibits regular commuting from population centers on the Reservation.

42-27 See response to comment 41-4.

42-28 You are correct. The summary in Section 3.A.I, Water Resources, has been revised to eliminate contradictions and irrelevant material.

42-29 The submitted plans of operations are not detailed enough to allow tar sand development at this time. The plans of operations satisfy requirements of the Combined Hydrocarbon Leasing Act of 1981 but are not adequate for allowing on-the-ground operations to begin. Thus, environmental assessments will be needed when more complete plans are submitted.

42-30 The proposed plans of operations were deemed sufficient for this lease conversion EIS. Should a decision to convert these leases be made, however, more enviromental analyses would be required before the types of commercial operation discussed in this EIS would be permitted.

42-31 The "D" referenced in Chapter 3, page 3-1, has been corrected to "C" in the final EIS.

RESPONSES TO COMMENT LETTER 42 (Continued)

42-32 Spent sand from experimental bitumen extraction is being analyzed to determine its physical and chemical properties. Chevron has stated that it is testing spent sand samples for physical and chemical properties suitable for a plant growth medium. Test results will be used to help determine effective erosion control and reclamation measures.

42-33 Soils and vegetation inventory data was recorded on 1:24,000-scale maps, not 1:240,000-scale maps. The EIS has been revised in Section 3.A.3, Soils and Vegetation, to correct this error. The baseline data presented by the companies varied in detail and consistency. To develop a consistent detail of data, the sources identified in the EIS were used. Data provided by the companies was evaluated.

42-34 BLM will require this stipulation for environmentally sensitive areas to protect special watershed management areas, critical wildlife habitat, and unique landforms.

42-35 See response to comment 42-1.

42-36 Identifying the complete soils and vegetation inventory would be voluminous and would detract from the more significant information included in this section. In keeping with Council on Environmental Quality guidelines to reduce bulk, the EIS included only information contributing to the reader's understanding of the impacts.

42-37 Detailed erosion control, reclamation, and revegetation plans will be a part of the construction, operation, and maintenance plan that would be approved by authorizing agencies and landowners before any construction.

See the Maintenance and Monitoring section of the Erosion Control, Revegetation Guidelines for Use On Federal Lands in Appendix A-7. The landowner or authorizing agency would certify successful revegetation and erosion control.

42-38 Third order soil surveys, which are conducted on similar land use areas throughout the western states, have been determined to provide the needed soil information to accurately evaluate reclamation potential and to determine effective erosion control, reclamation, and vegetation measures.

42-39 The 10 percent applies to individual crucial habitats (such as winter range), not to all habitats totaled. See Section 3.A.4, Wildlife, for an explanation of how the percentage figure was derived.

42-40 The paragraph states that "...it is anticipated that significant adverse direct and indirect impacts would occur..." (page 3-32, column 2, paragraph 6 of the draft EIS (Section 3.4.A, Wildlife).

42-41 The "zone of influence" is an area around a mine, whereas the "area of influence" consists of the much larger area affected by such factors as population and housing.

42-42 Because no wildlife density data exists for the STSA, BLM's wildlife specialist has assumed that wildlife are equally distributed, realizing the pitfalls of this assumption. In this EIS, the main reason to use this type of analysis is to show that wildlife will be displaced.

42-43 Because the potential to displace 11 percent of the deer herd exceeds the signficance criterion of 10 percent, deer would be significantly affected.

42-44 The paragraph on page 3-36 of the draft EIS (Section 3.A.4, Wildlife) refers to snowshoe hares and states that the species would repopulate once reclamation is complete. "Complete" means that the area is returned to its preconstruction density and production.

42-45 Page 3-37, column 1, paragraph 3 of the draft EIS (Section 3.A.4, Wildlife) states that "habitat for snowshoe hares would take a much longer time to develop; and since many of the steeper, conifer-covered slopes would be forever altered, snowshoe hare habitat may never develop again in the affected area." If reclamation were complete, essential habitat would be present. See response to comment 42-42 for an explanation of the assumption that various species, including reptiles and grouse, space themselves equally over an area.

42-46 Five years after completed reclamation, the authorized officer will determine whether a revegetation attempt is substantially advanced. In the absence of specific tar sand regulations, the guide used in this determination will be the regulations developed by the Office of Surface Mining in 1983 for surface coal mining (30 CFR 816) with the exception that the standards for success will be based on plant diversity.

42-47 Mitigation measure 7 (6 in the final EIS) refers only to sage grouse nesting areas. The other measures apply to big game. In addition, the authorized officer can change these dates on a site-by-site basis.

42-48 Your concerns should be addressed during the prevention of significant deterioration (PSD) permitting phase. This technical report was not prepared in support of a PSD permit but to meet the specifications and requirements of the National Environmental Policy Act and Council on Environmental Quality regulations, which were followed in preparing the draft and final EISs. We agree that the more detailed analysis required for a PSD permit may not coincide with the EIS analysis. More detailed project development information and meteorological data would be needed for a PSD permit. The added information might change the analysis results.

RESPONSES TO COMMENT LETTER 42 (Continued)

42-49 The impact differences are due to production level differences. In the Sunnyside EIS, the proposed actions' production level is 115,000 BPD, whereas in the Utah Combined Hydrocarbon Leasing Regional EIS, the high production level for the Sunnyside STSA is 135,000 BPD.

42-50 The results suggest that significant acidic nitrogen deposition might occur on the Uintah and Ouray Indian Reservation.

Comment Letter 43

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

FEB 0 6 1984

Ref: 8PM-EA

Gene Nodine, District Manager
Bureau of Land Management
125 West 200 South
P.O. Box 970
Moab, Utah 84532

Dear Mr. Nodine:

The Region VIII office of the Environmental Protection Agency (EPA) has completed its review of the Sunnyside Combined Hydrocarbon Lease Conversion draft Environmental Impact Statement (DEIS). We reviewed with interest the BLM preferred alternative of unitized development of all twenty-three leases. We agree that this type of development could lead to a more efficient and orderly recovery of the tar-sand resource.

43-1 EPA would like to see the final EIS address the feasibility of an alternative of unitized development of partially converted leases. Allowing only partial conversion establishes an initial constraint for resource protection in environmentally sensitive areas and would probably be more economically realistic. These front-end limitations could prove more effective than trying to constrain the full leases development later on. We believe that the cumulative environmental impacts of the proposed actions alternative would be unacceptable.

There is inadequate information at this time for us to make a judgement on the reasonableness of impacts which could result from BLM's preferred alternative of unitized development of the proposed leases. It is unfortunate that only minimal data is available, particularly for unitized development, to make the leasing decisions within the fifteen-month processing time allotted under the lease conversion provisions.

43-2 It is EPA's understanding that the DEIS is a decision document as well as a potential tar-sand resource development document. The DEIS states that additional environmental analyses would be required before commercial lease production. These analyses are apparently limited to "mine plan review and monitoring program by BLM." We are concerned that the present DEIS does not provide sufficient information to proceed to a mine and operations plan phase. Section 8 of the Combined Hydrocarbon Leasing Act, PL 97-78, states that the Plan of Operations will provide "reasonable protection of the environment". The National Environmental Policy Act (NEPA) process to be followed for these additional analyses should be specified in the final EIS. It appears that site-specific EIS's will need to be tiered to this EIS and must be sensitive to the disclosures of the Utah Combined Hydrocarbon Regional DEIS.

43-3 EPA is pleased to have provided pre-DEIS comments on Air Quality Analysis for the Eastern and South Central Combined Hydrocarbon Project. We still feel that the limited amount of data available does not provide for an adequate technical review of Air Quality impacts.

Our detailed concerns and comments are attached for your consideration in the preparation of the final EIS.

According to our guidelines, we have rated this DEIS as ER-2. This means we have environmental reservations regarding some aspects of the proposed action. In particular, if combined full production capacity of the five tar-sand projects assessed in the DEIS were implemented the loss of watersheds, impacts on water quality, and the violation of NAAQS could not be mitigated. Something less than full lease conversion and additional information related to our comments and concerns, would enable a better assessment of environmental impacts and may help to alleviate our environmental reservations. If you have any questions, please contact Mike Hammer of my staff at FTS 327-2351.

Sincerely yours,

John G. Welles
Regional Administrator

Enclosure

EPA COMMENTS ON THE SUNNYSIDE
COMBINED HYDROCARBON LEASE CONVERSION DEIS

WATER QUALITY IMPACT ASSESSMENT

43-4 The DEIS states that additional environmental analysis would be done for each detailed project plan. It is very important to clarify the continuing NEPA process that will be followed to disclose impacts and mitigation commitments. In response to Sections 202(f) and 309(e) of the Federal Land Policy and Management Act of 1976 and the CEQ regulations for NEPA implementation, EPA needs to be aware of the public and agency participation plans for these subsequent environmental analyses.

43-5 Tables 3-4, 3-27, and 3-38 do not focus on cumulative water quality and quantity impacts to Grassy Trail, Nine Mile, and Range Creeks. The tables should be expanded to include this information. It would appear that commercial operations would result in depletion of the above-mentioned streams in addition to the Price and Green Rivers (contrary to the statement made on the bottom right of page 3-70).

43-6 The DEIS states on page 3-70 that impacts to Nine Mile Creek Watershed, under this partial conversion alternative, would be similar to those discussed under the proposed actions. The potential to exceed State water quality standards is still high. A statement is made on the same page that the partial conversion alternative would minimize "impacts on the various watersheds." This appears to be a contradictory assessment and should be clarified.

43-7 The DEIS provides little direct disclosure of surface or ground water problems that could be associated with spent sand disposal. These disclosures are needed.

43-8 Chapter 4 has site-specific mitigation addressed for water resources. We recommend that the water resource impacts that are further reduced by this mitigation be discussed on page 4-5.

43-9 We would like to see Grassy Trail, Range, and Nine Mile Creeks shown as "Environmentally Sensitive Areas" on Map 4-1. The Site-Specific Mitigation and Proposed Actions sections of Chapter 4 could then apply more comprehensively to these critical aquatic areas.

43-10 We assume from the DEIS that any of the development alternatives would cause trends with significant impacts to water resources and water quality. These trends and impacts should be discussed on page 4-6.

43-11 The irreversible and irretrievable commitment of the water resources is listed in Table 4-3. However, the relationship of short-term use of the water resource and long-term productivity/quality is not defined. In addition, Table 4-3 covers only the proposed actions alternative. These commitments for the other development alternatives should be shown in a similar table.

WATER QUALITY IMPACT PLANNING/CONTROLS

43-12 The National Pollutant Discharge Elimination System (NPDES) is mentioned on page 4-3. The NPDES program for point source water pollution controls and the relationship to the proposed development should be addressed in Appendix A-3 as existing operating requirements. Applicant responsibilities should also be addressed. Administration of this program has not been delegated by EPA to the State of Utah. Consequently, NPDES program administration efforts of EPA are coordinated with the State.

43-13 Water quality monitoring remains an issue to be clarified. The statement is made that the applicants "have proposed or are currently involved in monitoring or research programs for ... water resources" (page 4-3). This is misleading in that Chevron - GNC appears to be the only applicant that has made water quality monitoring commitments (whether both ground and surface water is included is unclear). ENERCOR indicates no program. The referenced statement should be clarified to reflect actual proposed or current programs. Water quality monitoring should be required as a condition of lease approval.

43-14 Table A-7-1 indicates numerous current deficiencies in Company operating plans. The DEIS should specifically state which deficiencies BLM will require to be adequately addressed before mining approval. Who will assure adequate development of reclamation and revegetation plans, runoff controls, and spent sand research and environmental controls as defined in Table A-7-1? What frequency and storm intensity criteria will be used in design of hydrological controls?

43-15 Water quality impacts should discuss the following potential sources of poor quality water:

Wastewater from production phase
Wastewater from upgrading phase
Dewatering and dust control
Leachate from storage piles (raw and process materials)
Runoff from disturbed areas
Wastewater from cooling and/or boiler facilities
Sanitary and sewer system effluents
Mitigation of any adverse impacts should be discussed.

43-16 The final EIS should evaluate alternative sources of water. In particular, poor quality water, such as irrigation return flows and other saline water should be considered in lieu of good quality water. This would be consistent with the salinity control policies of the State of Utah and the Colorado River Basin Salinity Control Forum.

43-17 The final EIS should state whether the authority of the State to monitor "the success of the reclamation for a period of 3 years" (page 4-3) includes monitoring of surface water before, during, and after development. Here again, who will do it?

The EIS should state whether all actual mining and related disturbances
will have runoff treated as a point source of pollution. After three years,
43-18 who assures adequate nonpoint source control and BMP maintenance from
reclaimed lands? We would like to see these water quality monitoring/control
issues clarified and defined in an integrated program (including point and
nonpoint sources) to assure responsibilities are clearly defined.

The DEIS states that construction, operation, maintenance, and
abandonment activities will be "performed in accordance with applicable ...
water quality standards" (page A-3-2). However, under the first two
development alternatives, the potential to exceed State water quality
standards ranges from very high to very low depending on the stream (impact
43-19 potential from the unitized development alternative is unclear). This is
further substantiated by the discussion of impacts to aquatic wildlife,
page 3-38. Mining under the proposed action alternative.."could eliminate the
present, limited, cold water fishery" and, "It is doubtful that after mining
is completed the streams left in the main block of the STSA ever could support
cold water fishery." (Fishery impacts under the other two alternatives should
be defined.) This would apparently be an unallowable removal of an "existing
43-20 use" as designated in the EPA-approved Utah water quality standards
(Class 3A cold water fishery for Grass Trail, Range, and Nine Mile Creeks)
under EPA Water Quality Standards regulations of 40 CFR Part 131. All this
presents a DEIS contradiction unless adequate controls would be enforced to
maintain existing State standards and beneficial uses. This issue needs
substantial discussion/clarification. Appendix 3 (page A-3-7) needs to
43-21 contain State of Utah Department of Health water quality standards as existing
operating requirements.

As we mentioned in our review of the preliminary draft EIS, the EIS needs
to clarify the anticipated impacts to aquatic systems, other than streams,
such as marshes and other categories of wetlands, and how these impacts will
43-22 be mitigated. There should be a clear indication on page A-3-6 that the Corps
of Engineers dredge and fill program is mandated by Section 404 of the Clean
Water Act. What activities will come under the Nationwide Permit? Which
activities will require an individual Section 404 permit?

Appendix A-4 is confusing in that there is no indication of BLM
43-23 commitment to requiring any of these additional mitigation measures. If they
are important, they should be lease conditions.

Use of amendments to BLM and local land use plans are discussed as a
means to avoid possible conflicts with the proposed development. The
43-24 alternative of project conformance to the environmental protection aspects of
these plans needs to be addressed in more depth.

The planning and development of tar sands need to be coordinated with the
Southwestern Utah Association of Local Governments water quality management
program.

GROUND WATER QUALITY

One rather obvious omission of applicable legislation listed in the DEIS
is the Safe Drinking Water Act, which authorizes both the Public Water Supply
43-25 (PWS) and Underground Injection/Control (UIC) Programs. These programs have
been delegated by EPA to the State of Utah; PWS to the Division of
Environmental Health; and UIC to the Division of Environmental Health
(Class I, II, IV, V) and the Division of Oil, Gas and Mining (Class II).

The Division of Environmental Health, within the scope of authorities and
responsibilities of the UIC program, can issue Class V UIC permits for the
purpose of assuring protection of underground sources of drinking water from
contamination by injection wells used for in-situ recovery of tar sands.

The criteria that would determine whether the Director of the State
program would issue a permit on this type of Class V well are contained in 40
CFR 144.12(c) and (d) of the Federal UIC Regulations and Section 7.4.5 of
Part VII of the State Regulations. These criteria are structured to prevent
violations of primary drinking water regulations as contained in 40 CFR 142
and adverse health effects from injection activities by Class V type wells.

The Sabine Production Company is proposing in-situ recovery in their plan
of operations (page 1-12). The actual type of in-situ process to be used will
be selected based on the results of the exploration phase but there is
indication that a steam injection process would be most likely (pages 1-37 and
1-39). There are two potential problems with this plan. First, there is no
43-26 discussion of the fate of the waters (steam) injected for recovery. There is
a great potential for loss of contaminated waters as it is stated that about
5000 acre-feet/year of make-up water would be required for a 5000 bpd
operation. Second, there is no discussion of the need to plug properly and
abandon the injection and recovery wells. The proposed plan indicates that
wells would be drilled at a rate of 150 wells per year (page 1-39).

In Chapter 4, page 4-1, under site-specific mitigation measures, it is
stated that complete hydrologic testing and evaluation will be done prior to
both surface and in-situ mining in order to protect important aquifers. It
further states that any loss of springs or reduction of streamflow will be
replaced with water of equal quantity and quality. The problem with this
statement is that it only addresses loss or reduction of flow. There seems to
43-27 be no concern with the potential contamination of aquifers that may contain
waters which meet the definition of an underground source of drinking water
(USDW). In addition, the "complete hydrologic testing and evaluation" results
should be provided to both EPA and the State of Utah so the information can be
used to develop special permit conditions to assure protection of USDW's or to
process requests for aquifer exemptions that may be necessary.

43-28 In Chapter 4, page 4-3, the BLM seems to be shifting the burden of project monitoring to the State of Utah. However, there is no discussion of the UIC permit requirements currently being implemented by the Utah Department of Health, Division of Environmental Health, Bureau of Water Pollution Control. In addition, Table 4-1, page 4-4, shows that there is virtually no monitoring being conducted or proposed to establish the baseline conditions for ground water in the STSA. The Sabine Production Company has not proposed any monitoring and yet this company is the one proposing the in-situ recovery method. Since the ground water data in the STSA is very limited (page 4-5), the BLM should require all companies involved in the STSA to conduct a full scale ground water monitoring program to establish the extent of the ground water resources available.

43-29 In Appendix A-3, pages A-3-6 and A-3-7, there is a general listing of State of Utah requirements that must be addressed for a lease to be issued. The Underground Injection Control Program administered by the Utah Division of Environmental Health, needs to be added to this list along with an explanation of the UIC program and the State's requirements.

AIR QUAILTY

43-30 As discussed in the air quality review of the DEIS for the Sunnyside leases, there are several concerns about the modeling methodologies. These concerns range from the lack of site-specific meteorological data and the use of non-concurrent off site meteorological data, to using a flat terrain model such as MESOPUFF to determine long range complex terrain impacts. The regional cummulative impacts do not examine interaction between the tar sand leases and the already permitted White River Oil Shale facility or the existing Huntington and Hunter Power Plants. The lack of accurate plant data and site-specific meteorological data reduces the possibility that the predicted elevated plume impacts of sulfur dioxide (SO_2) and nitrogen oxide (NO_x) are correct in their location and magnitude.

Acid deposition impact of sulfur and nitrogen species were modeled. This modeling indicates deposition concentrations of sulfur species close to the limit considered safe from damage due to acid deposition. No values of safe limits of NO_x deposition presently exists. When the impact of both the sulfur and nitrogen species are combined, damage from acid deposition at the Uintah and Ouray Indian Reservations is almost certain. The Uintah and Ouray Indian Reservations will also experience degradation of visibility according to the Level II analysis performed. As expressed in the EIS, additional controls on SO_2 and NO_x emissions will help mitigate some of the National Ambient Air Quality Standards (NAAQS) violations, decrease acid deposition and improve visibility.

The potential for violation of the particulate NAAQS is so certain that no amount of TSP control will mitigate the massive problem. All three of the different production scenarios caused predicted violations of the short-term and annual TSP. These predicted violations occur even when an unrealistic 80% control efficiency is assumed in the arid climate.

The summary of probable impacts from the high production scenarios of the tar-sands leases is very disturbing. Even if no tar sands were to be developed, modeling shows that based on the expected large population growth which Utah can expect by the year 2005, there will be areas that will exceed the TSP NAAQS. While it is possible to increase controls on the gaseous pollutants, SO_2 and NO_x at the tar-sands facilities, the prospect for maintaining the NAAQS for TSP is not promising. The massive exceedance over the entire Sunnyside area of the TSP NAAQS which is a health related standard should not be taken lightly. Most of the activity generated TSP is of the small respirable size, under 10 um. The health effects of this size of particle is not yet fully understood.

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RESPONSES TO COMMENT LETTER 43

43-1 The EIS did not consider an alternative of unitized development of partially converted leases because the combined range of impacts for the separate partial conversion and unitized development alternatives would not differ significantly from an alternative resulting from combining the two alternatives. The decision maker may select bits and pieces from any of the analyzed alternativee to arrive at a final decision.

43-2 An EIS is not a decision document. It is a document that assists the decision maker in his role. You are correct in stating that later site-specific National Environmental Policy Act documents will have to be tiered to this EIS and to the Regional EIS. See Section 1.A, Introduction, for a discussion of tiering this EIS to others.

43-3 An extensive meteorological data base was compiled for the study (see Table 2.1-1 of Aerocomp Inc. 1983). Meteorological data collected at or near the proposed plant sites is, however, almost nonexistent. Inadequacies in the data would be rectified before the permitting phase.

43-4 Any later environmental analyses based on new or updated plans of operations would follow Federal Land Policy and Management Act and National Environmental Policy Act regulations. Future environmental analysis would be tiered to this EIS and the Regional EIS. When these future environmental analyses are begun, the Environmental Protection Agency would be made aware of public and agency participation plans (see Section 1.A, Introduction).

43-5 Table 3-4 shows the cumulative impacts of the proposed actions and interrelated projects to Range Creek, and Table 3-26 shows the cumulative impacts of partial conversion to Grassy Trail and Nine Mile creeks. The statement on the bottom right of page 3-70 of the draft EIS refers to the partial conversion alternative, under which none of the above-mentioned streams would be used for water supply.

43-6 Adverse impacts of the proposed actions on Nine Mile Creek would consist of rare events when standards might be exceeded as they are now. Adverse impacts of partial conversion would be similar to those of the proposed actions but less severe because less area would be disturbed. Section 3.B.1, Water Resources, has been changed accordingly.

43-7 Applicants are committed or will be required to either treat or reuse wastewater, protect ground water against leachate contamination, and employ appropriate reclamation techniguee. Surface water runoff from the spent sand piles would be collected and treated before releaee. These potential problems will be addressed in detail during the permitting process (see Section 1.A, Introduction).

43-8 As you suggested, a paragraph has been added to Section 4.C.1, Unavoidable Adverse Impacts, Proposed Actions, addressing further reductions in water resource impacts.

RESPONSES TO COMMENT LETTER 43 (Continued)

43-9 Only portions of these watersheds would be affected. The level and significance of impacts would be determined by the effectiveness of mitigation. The commitmente of the applicants and reguired measures would reduce or eliminate water resource impacts in the parts of these watersheds not shown as critical areas on Map 4-1.

43-10 Page 4-1 of the draft states that important aguifers would be protected and that spring or stream loss would be replaced. Further, water resources are not included in Unavoidable Adverse Impacts or in Trends Having Significant Impacts. Most of the impacts remaining after mitigation would be slight and would not establish a trend and are thus not discussed in Section 4.D.1, Trends Having Significant Impacts. See Section 3.A.1 for a discussion of the proposed actions' impacts on water resources.

43-11 Section 4.D.3, Commitment of Resources, defines irreversible and irretrievable commitment of resources. The first paragraph, column 2 on page 4-9 of the draft was rewritten in this final to clarify that Table 4-3 covers the proposed actions and all EIS alternatives.

43-12 A reference to the NPDES program has been added to Appendix A-3.

43-13 The statement has been changed accordingly in Section 4.B.2, Applicants' Baseline and Impact Monitoring Programs.

43-14 See response to comment 41-58.

Frequency and storm intensity criteria will be reguired by BLM's Utah State Office for design of hydrological controls.

43-15 The water guality analysis included the potential sources of poor-guality water. The use of any or all of the poor-guality water sources would not eliminate the need for other water. Therefore, the worst-case was assumed for predicting impacts.

43-16 Because of the conceptual nature of the proposed projects, the exact source of the applicants' water has not been determined. The analysis of impacts of water use thus considered the guantity not the guality of water to be consumed and the effect of removing this water from streams. If the consumed water is of better guality than stream waters, stream water guality would deteriorate. Conversely, if the water consumed is of poorer guality than the stream waters, then the guality of the stream waters would improve.

Because all water in the area is appropriated, water rights would have to be leased or purchased, and, because most water is used for irrigation, use of these irrigation rights for tar sand development would maintain streamflows and improve water guality by eliminating saline return flows of irrigation water.

43-17, 43-18 Permit requirements include a description of existing water resources detailed enough to allow evaluation of the impacts of development. Also required are monitoring programs during operation and throughout rehabilitation (see Table 4-1). Where the state has the responsibility to issue permits, it will be responsible for monitoring. On federal land, the U.S. Government will be responsible for monitoring. BLM monitors only the reclamation for lands for which it is responsible. The actual split will not be known until more site-specific data is known and rights-of-way and permits have been issued.

43-19 This section in Appendix A-3 has been revised.

43-20 The text in Sections 3.B.4 and 3.C.4, Wildlife, has been reworded to state your concerns.

43-21 These changes have been added to Appendix A-3.

43-22 The only areas that could be considered marshes or other wetlands are small, less than 1-acre areas below some undeveloped springs, which may be perennially wet. These areas would be destroyed by surface mining but unaffected by in-situ recovery. This change has been added to Appendix A-3. No activities have been proposed that would require either the nationwide permit or a Section 404 Permit.

43-23 These measures were identified during the impact analysis as mitigation that could further alleviate or reduce impacts. These measures, however, are not committed to by the federal agencies or applicants. They are presented as more information and for use by the applicants for voluntary implementation or by authorized officials for possible future permit stipulations (see Appendix A-4.)

43-24 Amendments to BLM land use plans using this EIS to analyze the impacts are only possible if the projects are developed within the scope of this EIS's presentation. Where this EIS documents the impacts of these potential land use changes, it can be used by the decision maker as rationale for authorizing the change. The alternative of "project conformance" to the enviromental protection aspects of these existing plans is the no action alternative, but the presently authorized direction is the basis for Chapter 3, Affected Environment and Environmental Consequences, and therefore needs no further analysis. The Final Regional EIS (BLM 1984) analyzes various alternatives to amending the plan.

The potential for amendments to non-BLM land use plans is properly shown in this EIS. This EIS cannot address the analysis of the impacts of these potential amendments, which have not been and may never be made and are not the function of the decision maker for this EIS.

43-25 This paragraph in Section 1.A.4, Authorizing Actions, has been reworded to include the Safe Drinking Water Act.

RESPONSES TO COMMENT LETTER 43 (Continued)

43-26 The companies propose to separate the produced water from the oil and reuse it. They have stated that no water will be discharged. The 5,000 acre-feet per year of make-up water is water that would be lost through the process, such as steam evaporation and molecular tie-up. All abandoned wells will be properly abandoned as required by federal and state law under standard oil and gas provisions, which are current stipulations to leases and which would be part of the new combined hydrocarbon leases.

43-27 This concern has been added to Section 4.A, Site-Specific Mitigation.

43-28 Section 1.A.4, Authorizing Actions, has been expanded to describe the procedures required to obtain approval of plans of operations.

43-29 The U.I.C requirements have been added to Appendix A-3.

43-30 See response to comment 43-3.

Complex terrain effects were handled implicitly in the wind field supplied to MESOPUFF. This wind field was generated by Aerocomp's diagnostic wind model, BU501, which is a terrain consistent code.

The interaction between the tar sand leases and existing or permitted major sources is examined in the Utah Combined Hydrocarbon Leasing Regional EIS (BLM 1984). The list of proposed major sources includes C&A Tar Sands, Chevron--GNC, Geokinetics, Hunter Power Plant Units 3 and 4, Magic Circle, Moon Lake Power Plant Units 1 and 2, Paraho, Plateau Refinery Expansion, SOHIO, Syntana-Utah, TOSCO, Western Tar Sands, and White River Oil Shale. Existing major sources considered in the regional analysis include Carbon power plant units 1 and 2, Hunter power plant units 1 and 2, Huntington Canyon power plant units 1 and 2, and the Plateau refinery.

Although BLM gave all lease applicants opportunity to supply emission inventories, only Mono Power Company responded with a detailed plan of operations. Plant data inadequacies will be rectified during the PSD permitting phase.

APPENDICES

APPENDIX A-1
CONSULTATION AND COORDINATION

PUBLIC INVOLVEMENT IN THE SCOPING PROCESS

The first step in preparing an environmental impact statement (EIS) is called "scoping." The scope of an EIS is the range of actions, alternatives, and impacts to be included in the document. The purpose of scoping is to determine the significant issues related to a proposed action that would be included in the EIS. Scoping is designed to reduce some of the past inefficiencies associated with EIS preparation. Its basic goal is to make EISs concise and meaningful to persons in the federal government who must make decisions on the proposal, as well as those in state and local government, and the people who may be affected by approval or disapproval of the proposal or its alternatives.

The scoping process used by the Bureau of Land Management (BLM) for the Sunnyside Combined Hydrocarbon Lease Conversion EIS involved several phases: planning for public involvement, sponsoring a public meeting, analyzing identifed concerns, and determining the scope of the EIS. The key development related to each of these phases are summarized below.

PLANNING FOR PUBLIC INVOLVEMENT

Following determination by the Utah State Director that an EIS was necessary for the Sunnyside lease conversion applications, the Moab District Office (in conjunction with the Denver Service Center, Division of EIS Services) began to plan for public involvement in the scoping process. A scoping meeting was arranged for Price, Utah.

The scoping meeting and the availability of background information on the proposed actions were publicized through a **Federal Register** notice and media announcements in Price and Salt Lake City.

SCOPING MEETING

The scoping meeting, held on March 9, 1983, was organized as an open house meeting. It was conducted jointly with the open house scoping meeting for the Utah Combined Hydrocarbon Regional EIS. Attendees were provided copies of background information about the EIS process and the proposed actions. Members of the Sunnyside and Regional EIS teams, and Price River Resource Area, Moab District, and Washington Office BLM personnel were on hand to listen to attendees' concerns about the proposed actions and to answer questions.

Following the close of the meeting, BLM personnel shared what they learned from the attendees. The concerns and questions raised by the attendees are listed below. All were considered in developing the scope of the Sunnyside EIS.

- Companies should unitize; they should design one good project that will become operational and provide for protection of the environment. The area needs the jobs that could be provided by tar sand development, but there is a right way and a wrong way to go about development.

- The water source that one company is proposing to use is the one that another company says it will preserve for the town of Sunnyside. How much water will be used and how much will be left for Sunnyside?

- If companies are permitted to dump overburden in Whitmore Canyon, the existing problem with siltation of the Grassy Trail Reservoir will increase.

- The proposed mines will break up the bitterbrush planting that is just getting established.

- Will the companies provide for public access to Bruin Point?

- What type of reclamation will be considered acceptable? How much land will be disturbed at one time? The companies should not be allowed to tear up the whole area before reclamation is started.

- Carbon County believes it is very important for the EIS preparers to work closely with local governmental agencies and use data developed by local people.

- Impacts to visual resources should not be considered a significant issue, because the Sunnyside area is not considered to be a Class I area.

- Cumulative impacts for the Sunnyside Special Tar Sand Area (STSA) should not be based on a total of the impacts of the 5 applicants' plans of operations, because some applicants have assumed use of the same resource base.

- The Sunnyside STSA should be expanded to include the proven tar sand reserves outside the STSA boundary.

Subsequent to the scoping meeting, BLM personnel attended a Carbon County Commissioners' meeting to discuss, in greater detail, local concerns related to the proposed actions and the EIS process. The concerns that were discussed are summarized in a letter from Carbon County, reprinted as Figure A-1-1.

The Ute Indian Tribe submitted its comments on the scope of the EIS in writing. These comments are reprinted as Figure A-1-2.

DETERMINING THE EIS SCOPE

The scope of the Sunnyside Combined Hydrocarbon Lease Conversion EIS was derived based on the issues and concerns identified through the public scoping process, preliminary research done by the EIS preparers (resource specialists from the BLM), information needs of the decision maker, and the relationship between the Sunnyside EIS and the Utah Combined Hydrocarbon Regional EIS. The scope evolved through lengthy discussions among Sunnyside EIS team members and through discussions among these team members and members of the Regional and Tar Sand Triangle EIS teams.

DRAFT EIS CONSULTATION AND COORDINATION

The agencies and groups that will receive a copy of the Draft EIS for formal review are listed below.

Federal Government Agencies

- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Reclamation
  - Fish and Wildlife Service
  - Geological Survey
  - National Park Service
  - Office of Environmental Project Review
  - Office of Surface Mining
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Advisory Council on Historic Preservation
- Department of the Army
  - Corps of Engineers
- Department of Energy
- Department of Housing and Urban Development
- Department of Transportation
- Environmental Protection Agency
- Federal Energy Regulatory Commission
- Federal Highway Administration
- Postal Service
- Synthetic Fuels Corporation

Environmental Groups

- American Wilderness Alliance
- Council on Utah Resources
- Defenders of the Outdoor Heritage
- Earth First
- Friends of the Earth
- Izaak Walton League
- National Audubon Society
- National Wildlife Federation
- Native Study Society
- Sierra Club

ISSUES OF CONCERN TO CARBON COUNTY

WITH REFERENCE TO THE SUNNYSIDE COMBINED

HYDROCARBON LEASE CONVERSION E.I.S.

1. Water Quality and Watershed Protection for both Whitmore and Range Creek Drainages.

The issue of which of these drainages will serve for industrial and which one for culinary is the most important concern for Carbon County as well as East Carbon and Sunnyside. This issue is very complex because of the ownership conflicts. Chevron/GNC has indicated a desire to use the Whitmore/Grassy Trail drainage for their rather substantial industrial needs. They are saying that East Carbon could then use the Range Creek drainage for its water needs. However, Amoco and Mono Power have large tar sands holdings at the head of Range Creek. These properties are going to have an impact on Range Creek just from the mining itself irregardless of where industrial water is drawn. It is critical that all of the major developers get together and talk over mutual management policies. We feel that the B.L.M., the state and the county cannot say yes to Chevron until we know what Amoco and Mono Power are going to do for their water needs.

With the magnitude of the various projects in mind it is an apparently obvious conclusion that there will be a general degradation of water quality in both streams which potentially would serve East Carbon. The water quality data submitted should be reviewed very carefully. There has already been water quality problems on the Range Creek drainage due to the high level of exploratory drilling going on in the area.

2. Establishment of Project Carrying Capacity.

Going along with number 1 above the E.I.S. should evaluate the effect of five individual projects as well as a smaller number beginning with just one project. It is Carbon Counties opinion that the area cannot support five separate projects. Probably one project should be the maximum allowed because of several reasons. First of all are the socio-economic considerations. Several projects would bring in many more transient construction workforce personnel which are expensive and difficult to manage and the impact would extend over a long period of time. One project would provide a manageable workforce over a fixed period of time. With several projects there would be duplication of services, need for more temporary structures (i.e. man-camps), many more people etc. which will put a burden on local governments which it may not be able to handle even with assistance from the developers.

We feel the area has a carrying capacity environmentally as well. There would obviously be impacts multiplied by the number of projects. There would be more discharge permits, more overburden stockpiles, more roads, more particulate emissions, more truck traffic and the list would go on and on. We hope the E.I.S. will not only state the impacts for the various development levels but go as far as to recommend what the carrying capacity should be. The E.I.S. could then be the catalyst to get all the

FIGURE A-1-1

players together at a very early stage and discuss the alternatives. An agreement between these major companies on production levels, number and size of projects, etc., will be difficult to arrive at, but for the welfare of the small towns in the area it must be done.

3. The Socio-economic Impact Statement.

Carbon County wishes to be involved in the preparation of this section of the document from the beginning. The statement has been underway since January and we have never been contacted as yet. We have seen in the past that most of the statements are not really useful documents for local governments and the companies have to duplicate the research to satisfy local and state requirements. Very simply the document should contain information on the effect of the project on at least the following:

Population
Housing-temporary and permanent
Water supply and watershed protection
Waste water disposal
Employment
Transportation (roads, etc.)
Public safety-police, fire, medical, etc.
School systems

These infrastructure elements need to be addressed for Carbon County generally, not just the East Carbon/Sunnyside area. Also it will be imperative that the E.I.S. address mitigation of the identified impacts. Things like front-end assistance, on-going assistance, operation and maintenance costs and subsidized housing if decided upon and others should be discussed. Close contact with the companies will be required to get this level of information. If this is not within the scope of the statement it should be. It will have to be done at some point.

We hope the statement will not make the mistake, as have several impact analyses lately, that the company will have little impact due to unemployment. By the time the Tar Sands projects get going there may not be any unemployment. The tar sands developments are dependent somewhat on oil prices as is the coal industry. A possible way to approach this problem is to provide several alternative development "scenarios". Each of these alternatives would assume different combinations of unemployment and immigration as well as different distribution models of the workforce. They can't all live in East Carbon/Sunnyside.

Carbon County would like to get together with B.L.M. and consultants and identify the further issues which need to be discussed.

4. Refuse Disposal.

The city of East Carbon is very concerned about anticipated plans of Chevron Oil to dispose of overburden in Spatafore Canyon which drains directly, over a short distance, into Grassy Trail Reservoir their culinary water source. This dilemma leads back to a decision on water sources for the town. We must decide which source of water the town will be use be it Whitmore or Range Creek. We will have to protect one or the other.

FIGURE A-1-1(cont)

Ute Indian Tribe
P.O. Box 190
Fort Duchesne, Utah 84026

(801) 722-5141

UTE INDIAN TRIBE FORT DUCHESNE, UTAH

In Reply:

RECEIVED

APR 18 1983

EIS OFFICE

April 13, 1983

Robert E. Piegel
EIS Services
Bureau of Land Management
555 Zang Street
First Floor East
Denver, Colo. 80228

Dear Bob:

Enclosed are the scoping comments of the Ute Tribe concerning the Sunnyside Combined Hydrocarbon Lease Conversion EIS. We look forward to a continued working relationship with your office and the BLM.

Respectfully,

Jason Cuch

Jason Cuch
Director of Resources

FIGURE A-1-2

The Ute Indian Tribe is concerned about:

AIR QUALITY

The proximate location of the Sunnyside property will affect air quality in the Uintah Basin and the Uintah and Ouray Reservation. Emissions from both construction and processing operations would enter the air shed of the Uintah Basin, reaching the Uintah and Ouray Reservation air shed first. This will impact the visibility (visual resource) and place limits on the available PSD air increments. In turn, air quality related values will be impacted as pollution levels increase and effect flora and fauna, and rains will increase soil sulfur levels and total suspended particles.

The Ute Indian Tribe requests that air quality studies include an examination of the impacts generated on the Uintah and Ouray Reservation and the Uintah Basin air shed, especially as relating to PSD liscensing.

RECREATION

Recreational facilities will also be impacted in the Uintah Basin by the Sunnyside work force and will require specific studies.

FIGURE A-1-2 (cont)

Trout Unlimited - Utah Chapter
Utah Native Study Society
Utah Wilderness Association
Women's Conservation Council of Utah

State Governments and Agencies

Utah
- Department of Community and Economic Development (and various divisions)
- Department of Health (and various divisions)
- Department of Natural Resources and Energy (and various divisions)
- Department of Social Services
- Department of Transportation
- Geological and Mineral Survey
- Governor's Office
- Library Commission
- Planning Coordinator's Office (State Clearinghouse)
- State Agriculture Stabilization Conservation Service Office

Local Governments

Utah
- Carbon County Commission
- Duchesne County
- East Carbon City Government
- Emery County Commission
- Grand County Commission
- Price City Government
- Sunnyside City Government
- Uintah County Commission

Ute Indian Tribe

APPENDIX A-2
SUMMARY OF APPLICANTS' PLANS OF OPERATIONS AND IMPACTS

The following tables are a compilation and summary of the applicants' proposed actions. Together the sum of these 5 sets of tables would equate to the collective totals previously discussed. The first two tables for each applicant present the data as discussed by them in their plans of operations. The final table summarizes the quantities of resources to be utilized and the potential effects on the Sunnyside Special Tar Sands Area (STSA) and surrounding area.

TABLE A-2-1
AMOCO: GENERAL DATA

Proposed Conversion	
Number of Leases	7
Area	9,602.08 acres
Exploration	
Duration of Exploration	1 year
Drill Rigs in Use at One Time	3
Trucks to be Used	8
Trips Per Truck Per Day	4
Maximum Workers at One Time	10
Total Area Disturbed and Reclaimed	13 acres
Test Mine (including ancillary facilities)	
Total Area Disturbed	116
Pilot Plant	
Synfuel Production Level	150 barrels/day
Location	Wellington, Utah
Total Area Disturbed	15 acres
Commercial Operation	
Commercial Operation Life	3[a] years
Tar Sand Mined Over 30[a] Years	3,150 million tons
Tar Sand Mined Per Year	105 million tons/year
Synfuel Production Level	50,000 barrels/day
Water Source	Price River
Water Use	12,000 acre-feet/year
Peak Construction Work Force	475 workers
Peak Operation Work Force	2,465 workers
Total Area Disturbed[b]	12,082 acres

[a]Amoco has stated commercial operation life would be 20 years plus. For analysis purposes, a life of 30 years was assumed.
[b]For an explanation of these acreages, see analysis assumptions in Section 1.C.2.

TABLE A-2-2
AMOCO: MAGNITUDE AND DURATION OF LAND DISTURBANCE
(acres)

	Total Surface Mine Disturbance			Acreage Disturbed at One Time	
				Duration	
Phase/Component	**Disturbed**	**Removed**	**Reclaimed**	**1 year**	**20+ years**
Exploration	13[a]	0	13	1[a]	0
Commercial Operation					
Mine	3,000	0	3,000	0	3,000
Plant	110	110	0	0	110
Spent Sand Disposal	1,500	0	1,500	0	750
Ancillary Facilities	870	0	870	870	0
Total	5,480[b]	110	5,370	870	3,860[b]

[a]During the exploration phase, a total of 13 acres would be disturbed; however, since each drill site would be reclaimed upon the completion of drilling, no more than 1 acre would be disturbed at one time.
[b]Over the life of the project (before abandonment), a total of 5,480 acres would be disturbed; however, as mining progresses, no more than 3,860 acres would be disturbed at one time. "Acreage disturbed at one time" is defined as the total acreage in the first four stages of reclamation as shown on Figure 1-9 (Chapter 1).

TABLE A-2-3
AMOCO IMPACT SUMMARY

Resource Element	Disturbance
Number of Leases - 7	
Lease Acreage - 9,602.8 ac	
Mine Life - 30 yr	
Total Disturbance - 12,092 ac	
Water Resources	
Source	Price River
Acreage	12,000 ac-ft/yr
Special Watershed Management Area Disturbance	1,000 ac
Socioeconomics	
Peak Construction Employment	475*
Peak Operation Employment	2,465
Vegetation and Soils	
Land Disturbance at One Time[a]	3,150 ac
Land Disturbance in Climatic Zone B	267 ac
Very Steep Terrain Area Disturbance[b]	7,989 ac
Wildlife	
Potential Population Reduction, Mule Deer Herd Unit 27B	5%
Area on Which Other Big Game Species Would Be Displaced	12,082 ac
Area on Which Resident Populations of Other Species Would be Lost	12,082 ac
Visual Resources[c]	
Area Significantly Affected, Class II	6,662 ac
Class III	775 ac
Class IV	3,750 ac
Undetermined	870 ac
Air Quality	
National Ambient Air Quality Standards	
Sulfur Dioxide[d] (3-hr)	474 $\mu g/m^3$
(24-hr)	130 $\mu g/m^3$
Annual	14 $\mu g/m^3$
Total Suspended Particulates[d] (24-hr)	685 $\mu g/m^3$
Annual	172 $\mu g/m^3$
Nitrogen Oxides[d] Annual	100 $\mu g/m^3$
Uintah and Ouray Indian Reservation	
Sulfur Dioxide (24-hr)	2 $\mu g/m^3$
Total Suspended Particulates (24-hr)	0 $\mu g/m^3$
Transportation Networks	
Level-of-Service lowered below C on US 6, SR 10, and SR 123.	
Increased volume and accidents.	
Agriculture	
Grazing Loss Per Year	180 AUM
Number of Allotments Affected	4
Cultural Resources	
Number of cultural resources affected cannot be known until area has been surveyed.	
Paleontology and Mineral Resources	
Paleontological Resources	Minor Loss
Resource Mined	105 million ton/yr
Oil Production	50,000 bpd

[a]Refer to Figure 2-1 in Chapter 2 showing land disturbance by year of operation.
[b]Lands with slopes exceeding 30 percent and dominated by 40 to 70 percent, including escarpments and canyon sides.
[c]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.
[d]National Ambient Air Quality Standard shown in parentheses.

ac = acre
ac-ft/yr = acre feet per year
AUM = animal unit month
bpd = barrels per day
ft/yr = feet per year
hr = hour
ton/yr = tons per year
$\mu g/m^3$ = micrograms per cubic meter
yr = year

*This figure has been changed to 1,899, but the change was received too late (4-16-84) to incorporate the change into the text of the EIS.

TABLE A-2-4
CHEVRON-GNC: GENERAL DATA

Proposed Conversion	
Number of Leases	1
Area	160.00 acres
Exploration	
Duration of Exploration	1 year
Drill Rigs in Use at One Time	1
Trucks to be Used	2
Trips Per Truck Per Day	4
Maximum Workers at One Time	3
Total Area Disturbed and Reclaimed	4 acres
Test Mine (including ancillary facilities)	
Total Area Disturbed	5 acres
Pilot Plant	
Synfuel Production Level	NA[a]
Location	NA[a]
Total Area Disturbed	NA[a]
Commercial Operation	
Commercial Operation Life	30 years
Tar Sand Mined Over 30 Years	222 million tons
Tar Sand Mined Per Year	7.4 million tons/year
Synfuel Production Level	10,000 barrels/day
Water Source	Price River
Water Use	4,500 acre-feet/year
Peak Construction Work Force	2,400 workers
Peak Operation Work Force	200 workers
Total Area Disturbed[b]	325 acres

[a]Not Applicable. Processing plant would be an expansion of the plant associated with the Chevron interrelated project described in Section 1.A.4.
[b]For an explanation of these acreages, see analysis assumptions in Section 1.C.2.

TABLE A-2-5
CHEVRON-GNC: MAGNITUDE AND DURATION OF LAND DISTURBANCE
(acres)

	Total Surface Mine Disturbance			Acreage Disturbed at One Time	
				Duration	
Phase/Component	Disturbed	Removed	Reclaimed	1 year	30 years
Exploration	4	0	4	4	0
Commercial Operation					
Mine	155	0	155	0	80
Plant	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]
Spent Sand Disposal	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]
Ancillary Facilities	170	170	0	170	0
Total	325[b]	170	155	170	80[b]

[a]Not Applicable.Processing plant would be an expansion of the 200-acre plant site associated with the Chevron interrelated project described in Section 1.A.5, Interrelationships.

[b]Over the life of the project (before abandonment), a total of 325 acres would be disturbed; however, as mining progresses, no more than 80 acres would be disturbed at one time. "Acreage disturbed at one time" is defined as the total acreage in the first four stages of reclamation as shown on Figure 1-9 (Chapter 1).

TABLE A-2-6
CHEVRON-GNC IMPACT SUMMARY

Resource Element	Disturbance
Number of Leases - 1	
Lease Acreage - 160 ac	
Mine Life - 30 yr	
Total Disturbance - 325 ac	
Water Resources	
Source	NA
Acreage	NA
Special Watershed Management Area Disturbance	0 ac
Socioeconomics	
Peak Construction Employment	2,000
Peak Operation Employment	380
Vegetation and Soils	
Land Disturbance at One Time[a]	80 ac
Land Disturbance in Climatic Zone B	0 ac
Very Steep Terrain Area Disturbance[b]	160 ac
Wildlife	
Potential Population Reduction, Mule Deer Herd Unit 27B	<1%
Area on Which Other Big Game Species Would Be Displaced	325 ac
Area on Which Resident Populations of Other Species Would be Lost	325 ac
Visual Resources[c]	
Area Significantly Affected, Class II	155 ac
Class III	0 ac
Class IV	0 ac
Undetermined	170 ac
Air Quality	
National Ambient Air Quality Standards	
Sulfur Dioxide[d] (3-hr)	0 $\mu g/m^3$
(24-hr)	0 $\mu g/m^3$
Annual	0 $\mu g/m^3$
Total Suspended Particulates[d] (24-hr)	180 $\mu g/m^3$
Annual	40 $\mu g/m^3$
Nitrogen Oxides[d] Annual	0 $\mu g/m^3$
Uintah and Ouray Indian Reservation	
Sulfur Dioxide (24-hr)	0 $\mu g/m^3$
Total Suspended Particulates (24-hr)	0 $\mu g/m^3$
Transportation Networks	
Level-of-Service lowered below C on US 6, SR 10, and SR 123. Increased volume and accidents.	
Agriculture	
Grazing Loss Per Year	6 AUM
Number of Allotments Affected	1
Cultural Resources	
Number of cultural resources affected cannot be known until area has been surveyed.	
Paleontology and Mineral Resources	
Paleontological Resources	Minor Loss
Resource Mined	14.4 million ton/yr
Oil Production	NA

[a]Refer to Figure 2-1 in Chapter 2 showing land disturbance by year of operation.

[b]Lands with slopes exceeding 30 percent and dominated by 40 to 70 percent, including escarpments and canyon sides.

[c]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[d]National Ambient Air Quality Standard shown in parentheses.

ac = acre
ac-ft/yr = acre feet per year
AUM = animal unit month
bpd = barrels per day
ft/yr = feet per year
hr = hour
ton/yr = tons per year
$\mu g/m^3$ = micrograms per cubic meter
yr = year

TABLE A-2-7
ENERCOR: GENERAL DATA

Proposed Conversion	
Number of Leases	3
Area	1,962.67 acres
Exploration	
Duration of Exploration	1 year
Drill Rigs in Use at One Time	1
Trucks to be Used	2
Trips Per Truck Per Day	4
Maximum Workers at One Time	5
Total Area Disturbed and Reclaimed	10 acres
Test Mine (including ancillary facilities)	
Total Area Disturbed	17 acres
Pilot Plant	
Synfuel Production Level	50 barrels/day
Location	Salt Lake City, Utah
Total Area Disturbed	0 (existing plant)
Commercial Operation	
Commercial Operation Life	20 years
Tar Sand Mined Over 20 Years	360 million tons
Tar Sand Mined Per Year	18 million tons/year
Synfuel Production Level	20,000 barrels/day
Water Source	Range Creek
Water Use	5,000 acre-feet/year
Peak Construction Work Force	2,500 workers
Peak Operation Work Force	800 workers
Total Area Disturbed[a]	3,000 acres

[a]For an explanation of these acreages, see analysis assumptions in Section 1.C.2.

TABLE A-2-8
ENERCOR: MAGNITUDE AND DURATION OF LAND DISTURBANCE
(acres)

	Total Surface Mine Disturbance			Acreage Disturbed at One Time	
				Duration	
Phase/Component	Disturbed	Removed	Reclaimed	1 year	20 years
Exploration	10[a]	0	10	1[a]	0
Commercial Operation					
Mine	1,500	0	1,500	0	400
Plant	100	100	0	0	100
Spent Sand Disposal	1,000	0	1,000	0	250
Ancillary Facilities	400	0	400	400	0
Total	3,000[b]	100	2,900	400	750[b]

[a]During the exploration phase, a total of 10 acres would be disturbed; however, since each drill site would be reclaimed upon the completion of drilling, no more than 1 acre would be disturbed at one time.

[b]Over the life of the project (before abandonment), a total of 3,000 acres would be disturbed; however, as mining progresses, no more than 750 acres would be disturbed at one time. "Acreage disturbed at one time" is defined as the total acreage in the first four stages of reclamation as shown on Figure 1-9 Chapter 1).

TABLE A-2-9
ENERCOR IMPACT SUMMARY

Resource Element	Disturbance
Number of Leases - 3	
Lease Acreage - 1,962.67 ac	
Mine Life - 20 yr	
Total Disturbance - 3,000 ac	
Water Resources	
Source	Range Creek
Acreage	5,000 ac-ft/yr
Special Watershed Management Area Disturbance	0 ac
Socioeconomics	
Peak Construction Employment	2,500
Peak Operation Employment	800
Vegetation and Soils	
Land Disturbance at One Time[a]	650 ac
Land Disturbance in Climatic Zone B	1,062 ac
Very Steep Terrain Area Disturbance[b]	1,342 ac
Wildlife	
Potential Population Reduction, Mule Deer Herd Unit 27B	1%
Area on Which Other Big Game Species Would Be Displaced	3,000 ac
Area on Which Resident Populations of Other Species Would be Lost	3,000 ac
Visual Resources[c]	
Area Significantly Affected, Class II	1,500 ac
Class III	0 ac
Class IV	100 ac
Undetermined	400 ac
Air Quality	
National Ambient Air Quality Standards	
Sulfur Dioxide[d] (3-hr)	252 $\mu g/m^3$
(24-hr)	70 $\mu g/m^3$
Annual	1 $\mu g/m^3$
Total Suspended Particulates[d] (24-hr)	163 $\mu g/m^3$
Annual	41 $\mu g/m^3$
Nitrogen Oxides[d] Annual	16 $\mu g/m^3$
Uintah and Ouray Indian Reservation	
Sulfur Dioxide (24-hr)	1 $\mu g/m^3$
Total Suspended Particulates (24-hr)	0 $\mu g/m^3$
Transportation Networks	
Level-of-Service lowered below C on US 6, SR 10, and SR 123. Increased volume and accidents.	
Agriculture	
Grazing Loss Per Year	42 AUM
Number of Allotments Affected	3
Cultural Resources	
Number of cultural resources affected cannot be known until area has been surveyed.	
Paleontology and Mineral Resources	
Paleontological Resources	Minor Loss
Resource Mined	18 million ton/yr
Oil Production	20,000 bpd

[a]Refer to Figure 2-1 in Chapter 2 showing land disturbance by year of operation.

[b]Lands with slopes exceeding 30 percent and dominated by 40 to 70 percent, including escarpments and canyon sides.

[c]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[d]National Ambient Air Quality Standard shown in parentheses.

ac = acre
ac-ft/yr = acre feet per year
AUM = animal unit month
bpd = barrels per day
ft/yr = feet per year
hr = hour
ton/yr = tons per year
$\mu g/m^3$ = micrograms per cubic meter
yr = year

TABLE A-2-10
MONO: GENERAL DATA

Proposed Conversion	
Number of Leases	7
Area	9,836.13 acres
Exploration	
Duration of Exploration	1 year
Drill Rigs in Use at One Time	2
Trucks to be Used	4
Trips Per Truck Per Day	4
Maximum Workers at One Time	12
Total Area Disturbed and Reclaimed	18 acres
Test Mine (including ancillary facilities)	
Total Area Disturbed	380 acres
Pilot Plant	
Synfuel Production Level	250 barrels/day
Location	Near Sunnyside, Utah
Total Area Disturbed	14 acres
Commercial Operation	
Commercial Operation Life	33 years
Tar Sand Mined Over 33 Years	884.4 million tons
Tar Sand Mined Per Year	26.8 million tons/year
Synfuel Production Level	30,000 barrels/day
Water Source	Green River
Water Use	9,345 acre-feet/year
Peak Construction Work Force	1,892 workers
Peak Operation Work Force	1,230 workers
Total Area Disturbed[a]	14,303 acres

[a]For an explanation of these acreages, see analysis assumptions in Section 1.C.2.

TABLE A-2-11
MONO: MAGNITUDE AND DURATION OF LAND DISTURBANCE
(acres)

	Total Surface Mine Disturbance			Acreage Disturbed at One Time	
				Duration	
Phase/Component	Disturbed	Removed	Reclaimed	1 year	33 years
Exploration	18	0	18	18	0
Commercial Operation					
Mine	4,510	0	4,510	0	650
Plant	57	57	0	0	57
Spent Sand Disposal	2,177	0	2,177	0	620
Ancillary Facilities	870	200	670	670	200
Total	7,614[a]	257	7,357	670	1,527[a]

[a]Over the life of the project (before abandonment), a total of 7,614 acres would be disturbed; however, as mining progresses, no more than 1,527 acres would be disturbed at one time. "Acreage disturbed at one time" is defined as the total acreage in the first four stages of reclamation as shown on Figure 1-9 (Chapter 1).

TABLE A-2-12
MONO IMPACT SUMMARY

Resource Element	Disturbance
Number of Leases - 7	
Lease Acreage - 9,863.13 ac	
Mine Life - 33 yr	
Total Disturbance - 14,403 ac	
Water Resources	
Source	Green River
Acreage	9,345 ac-ft/yr
Special Watershed Management Area Disturbance	2,280 ac
Socioeconomics	
Peak Construction Employment	1,892
Peak Operation Employment	1,230
Vegetation and Soils	
Land Disturbance at One Time[a]	1,270 ac
Land Disturbance in Climatic Zone B	361 ac
Very Steep Terrain Area Disturbance[b]	7,968 ac
Wildlife	
Potential Population Reduction, Mule Deer Herd Unit 27B	5%
Area on Which Other Big Game Species Would Be Displaced	14,403 ac
Area on Which Resident Populations of Other Species Would be Lost	14,403 ac
Visual Resources[c]	
Area Significantly Affected, Class II	10,830 ac
Class III	238 ac
Class IV	4,500 ac
Undetermined	870 ac
Air Quality	
National Ambient Air Quality Standards	
Sulfur Dioxide[d] (3-hr)	576 $\mu g/m^3$
(24-hr)	160 $\mu g/m^3$
Annual	8 $\mu g/m^3$
Total Suspended Particulates[d] (24-hr)	175 $\mu g/m^3$
Annual	44 $\mu g/m^3$
Nitrogen Oxides[d] Annual	67 $\mu g/m^3$
Uintah and Ouray Indian Reservation	
Sulfur Dioxide (24-hr)	1 $\mu g/m^3$
Total Suspended Particulates (24-hr)	0 $\mu g/m^3$
Transportation Networks	
Level-of-Service lowered below C on US 6, SR 10, and SR 123.	
Increased volume and accidents.	
Agriculture	
Grazing Loss Per Year	91 AUM
Number of Allotments Affected	9
Cultural Resources	
Number of cultural resources affected cannot be known until area has been surveyed.	
Paleontology and Mineral Resources	
Paleontological Resources	
Resource Mined	26.8 million ton/yr
Oil Production	30,000 bpd

[a]Refer to Figure 2-1 in Chapter 2 showing land disturbance by year of operation.

[b]Lands with slopes exceeding 30 percent and dominated by 40 to 70 percent, including escarpments and canyon sides.

[c]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[d]National Ambient Air Quality Standard shown in parentheses.

ac = acre
ac-ft/yr = acre feet per year
AUM = animal unit month
bpd = barrels per day
ft/yr = feet per year
hr = hour
ton/yr = tons per year
$\mu g/m^3$ = micrograms per cubic meter
yr = year

TABLE A-2-13
SABINE: GENERAL DATA

Proposed Conversion	
Number of Leases	5
Area	7,240.04 acres
Exploration	
Duration of Exploration	1 year
Drill Rigs in Use at One Time	1
Trucks to be Used	1
Trips Per Truck Per Day	4
Maximum Workers at One Time	5
Total Area Disturbed and Reclaimed	21 acres
Test Mine (including ancillary facilities)	
Total Area Disturbed	NA[a]
Pilot Plant	
Synfuel Production Level	1,000 barrels/day
Location	conversion area
Total Area Disturbed	105 acres
Commercial Operation	
Commercial Operation Life	55 years
Tar Sand Mined Over 55 Years	NA[a]
Tar Sand Mined Per Year	NA[a]
Synfuel Production Level	5,000 barrels/day
Water Source	Green River
Water Use	5,000 acre-feet/year
Peak Construction Work Force	60 workers
Peak Operation Work Force	35 workers
Total Area Disturbed[b]	6,135 acres

[a]Not Applicable. In-situ recovery operation.

[b]For an explanation of these acreages, see analysis assumptions in Section 1.C.2.

TABLE A-2-14
SABINE: MAGNITUDE AND DURATION OF LAND DISTURBANCE
(acres)

	Total In-Situ Recovery Disturbance			Acreage Disturbed at One Time	
				Duration	
Phase/Component	**Disturbed**	**Removed**	**Reclaimed**	**1 year**	**55 years**
Exploration	21	0	21	21	0
Commercial Operation					
Mine	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]
Plant	6,000	0	6,000	0	1,000
Spent Sand Disposal	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]
Ancillary Facilities	135	45	90	90	45
Total	6,135[b]	45	6,090	90	1,045[b]

[a]Not Applicable. Component not required for an in-situ recovery operation.

[b]Over the life of the project (before abandonment), a total of 6,135 acres would be disturbed; however, as the well field progresses, no more than 1,045 acres would be disturbed at any one time. "Acreage disturbed at one time" is defined as the total acreage in the first 4 stages of reclamation as shown on Figure 1-9 (Chapter 1).

IMPACT SUMMARY — APPLICANT OPERATION PLANS

TABLE A-2-15
SABINE IMPACT SUMMARY

Resource Element	Disturbance
Number of Leases - 5	
Lease Acreage - 7,240.04 ac	
Mine Life - 55 yr	
Total Disturbance - 6,135 ac	
Water Resources	
Source	Green River
Acreage	5,000 ac-ft/yr
Special Watershed Management Area Disturbance	680 ac
Socioeconomics	
Peak Construction Employment	60
Peak Operation Employment	35
Vegetation and Soils	
Land Disturbance at One Time[a]	1,000 ac
Land Disturbance in Climatic Zone B	0 ac
Very Steep Terrain Area Disturbance[b]	3,926 ac
Wildlife	
Potential Population Reduction, Mule Deer Herd Unit 27B	2%
Area on Which Other Big Game Species Would Be Displaced	6,135 ac
Area on Which Resident Populations of Other Species Would be Lost	6,135 ac
Visual Resources[c]	
Area Significantly Affected, Class II	1,000 ac
Class III	3,500 ac
Class IV	0 ac
Undetermined	135 ac
Air Quality	
National Ambient Air Quality Standards	
Sulfur Dioxide[d] (3-hr)	612 $\mu g/m^3$
(24-hr)	170 $\mu g/m^3$
Annual	7 $\mu g/m^3$
Total Suspended Particulates[d] (24-hr)	44 $\mu g/m^3$
Annual	12 $\mu g/m^3$
Nitrogen Oxides[d] Annual	6 $\mu g/m^3$
Uintah and Ouray Indian Reservation	
Sulfur Dioxide (24-hr)	2 $\mu g/m^3$
Total Suspended Particulates (24-hr)	0 $\mu g/m^3$
Transportation Networks	
Level-of-Service lowered below C on US 6, SR 10, and SR 123. Increased volume and accidents.	
Agriculture	
Grazing Loss Per Year	66 AUM
Number of Allotments Affected	2
Cultural Resources	
Number of cultural resources affected cannot be known until area has been surveyed.	
Paleontology and Mineral Resources	
Paleontological Resources	Minor Loss
Resource Mined	In-Situ
Oil Production	5,000 bpd

[a]Refer to Figure 2-1 in Chapter 2 showing land disturbance by year of operation.

[b]Lands with slopes exceeding 30 percent and dominated by 40 to 70 percent, including escarpments and canyon sides.

[c]Refer to Appendix A-9, Visual Resource Management Methodology, for definitions of VRM classes.

[d]National Ambient Air Quality Standard shown in parentheses.

ac = acre
ac-ft/yr = acre feet per year
AUM = animal unit month
bpd = barrels per day
ft/yr = feet per year
hr = hour
ton/yr = tons per year
$\mu g/m^3$ = micrograms per cubic meter
yr = year

APPENDIX A-3
EXISTING OIL AND GAS PROVISIONS AND REQUIRED GENERAL MEASURES DESIGNED TO REDUCE IMPACTS

The Impact analysis presented in this EIS assumed compliance with mitigation measures that likely would be rewritten as stipulations attached to federal or state authorizations. This agency-committed mitigation falls into two categories: (1) provisions of the existing oil and gas leases that could be carried forward in some form as part of a new combined hydrocarbon lease and (2) general measures typically included in agency authorizations for projects similar to the ones studied in this EIS.

EXISTING OIL AND GAS PROVISIONS

Under the conversion regulations (47 CFR 3140.4-2), a combined hydrocarbon lease will contain all terms and conditions needed to ensure compliance with the plan of operations, including any needed stipulations that were part of the original oil and gas lease being converted. General provisions of an oil and gas lease that could be carried forward should a lease be converted are identified below. The actual stipulations that would be included for a specific combined hydrocarbon lease, however, would be determined on a case-by-case basis.

1. The lessee will submit in writing to the BLM district manager for advance written approval, a detailed plan of operations, which will discuss any operation that could cause property damage or land disturbance or induce erosion, including any planned use of earth-moving or similar mobile equipment. Operations that will be discussed in the plan include exploratory drilling, building of access roads, and seismographic explorations.

2. Any drilling, construction, or other operation on the leased lands that will disturb the land surface or otherwise affect the environment will be subject to prior BLM approval.

3. Activities on the lease will be conducted in accordance with applicable regulations, including such requirements as the BLM may prescribe as needed to prevent environmental damage.

REQUIRED GENERAL MEASURES DESIGNED TO REDUCE IMPACTS

As a condition of granting any lease conversions or other authorizations, the various agencies would require that certain terms and conditions be met. Some of these general measures are presented in this appendix. As project plans are completed and before specific authorizations are given, more specific requirements would be added by the authorizing agencies, including a wildlife mitigation plan developed jointly by BLM, the Utah Division of Wildlife Resources (UDWR), the Forest Service (FS), and the applicants.

The Federal Government has mandates to protect threatened and endangered species and their critical habitat; historical, archaeological, and paleontological resources; and wild horses and burros. Moreover, areas exist with the potential for classification as wilderness. Other areas having special designation must also be protected. This EIS assumes that enough funding would be provided to properly enforce required mitigating measures.

The following acts grant authority for mitigating the loss of vegetation, livestock forage, wildlife habitat, and archaeological and paleontological values, and a decline in water and air quality, aesthetics, and recreation on federal lands:

Organic Administration Act of 1897
Reclamation Act of 1902
Preservation of American Antiquities Act of 1906
Wilderness Act of 1964
Historic Preservation Act of 1966
Executive Order 11593 of 1971 (Protection and Enhancement of the Cultural Environment)
Archaeological and Historical Data Preservation Act of 1974
Federal Land Policy and Management Act of 1976
The Clear Air Act as Amended in 1977
The Federal Clean Water Act of 1977
Endangered Species Act as Amended in 1978
Executive Order 12088

Federal regulatory agencies would also require compliance with safety and noise level regulations imposed by the Occupational Safety and Health Act of 1970; with the Federal Aviation Administration clearance standards, granted under authority of the

Federal Aviation Act of 1958; and with grounding and clearance requirements of the National Electric Safety Code.

As future conditions may result in project plan refinement or adjustment, all mitigating measures outlined here could be changed as needed within authorized limits by the appropriate federal official.

Should future off-lease rights-of-way be needed on federal lands, further environmental analysis would be conducted with a future right-of-way grant, a construction, operation, and maintenance (COM) plan or similar document would be prepared covering the construction of all project facilities on federal land. This plan would be submitted for approval to the authorizing agency before work begins on the ground. The COM plan would contain the following sections on site-specific stipulations:

- *Fire Protection*
- *Clearing*
- *Visual Resources*
- *Erosion Control, Revegetation, and Restoration—specific guidelines for the Erosion Control, Revegetation, and Restoration Section of the COM plan are included in this EIS as Appendix A-7, Reclamation and Erosion Control Programs*
- *Transportation*
- *Communications*
- *Cultural Resources*
- *Threatened and Endangered Studies and Mitigation (including a wildlife mitigation plan developed jointly by UDWR, BLM, FS, and the applicant)*
- *Blasting*
- *Pesticide and Herbicide Use*
- *Health and Safety*
  - *a. Solid Waste*
  - *b. Emergency Response*
  - *c. Air Quality*
  - *d. Transportation*
- *Site Prescription*
- *Right-of-Way Maintenance and Monitoring*

Because the actions would involve many types of terrain, soils, vegetation, land uses, and climatic conditions, the sections within the COM plan would include sets of techniques and measures tailored to each condition found.

Technical assistance and approval of written plans for federal lands would be obtained from BLM before construction.

Under authority of Section 504 of the Federal Land Policy and Management Act (FLPMA), the applicants would be required to fund the appropriate federal agencies to finance one or more specialists for administering construction.

BUREAU OF LAND MANAGEMENT

GENERAL

1. The projects will be built, operated, maintained, and abandoned in accordance with permits issued under applicable laws, including the Clean Air Act, as amended (42 USC 1321) and the Clean Water Act (USCA 1251).

2. Permittees and other regular users of public lands affected by project construction will be notified in advance of any construction that may affect their businesses or operations, including the signing of temporary road closures, notification of proposed removal or cutting of fences, and disturbances to range improvements or other structures.

TRANSPORTATION

1. A transportation plan will be submitted as part of the COM plan. This plan will cover approval of temporary, built, and newly built roads and will include clearing, signing, rehabilitation, and uses associated with transportation needs. Overland access could be specified in the place of road building or reconstruction.

2. Access roads needed for operation and maintenance of the projects will be clearly identified. Some of these access roads may be designated by the authorizing agency as open for public use, including off-road vehicle (ORV) travel.

3. Helicopters will be used to string pipe and deliver equipment where access due to the terrain or management constraints precludes standard construction.

4. Portions of the lease conversion and other authorized areas for use will be used as access roads only when necessary and only during the construction period. The temporary access roads will be closed and vegetation cover reestablished after construction is completed. No maintenance roads along linear facilities will be permitted.

5. The applicants will control ORV use within the lease conversion areas. Such specified control could

include use of physical barriers, replanting trees, or other reasonable means of ORV control.

6. Gates or cattle guards on established roads on public land will not be locked or closed by the applicants.

LAND USE

1. Disturbance of improvements such as fences, roads, and watering facilities during construction, operation, and maintenance must be kept to a minimum. Immediate restoration to any damage of improvements to at least their former state will be required. Functional use of these improvements must be maintained at all times. When necessary to pass through a fence line, the fence will be braced on both sides of the passageway before the fence is cut. A gate acceptable to the authorized officer will be installed in the gate opening and kept closed when not in use. Where a permanent road is to be built or maintained, cattleguards will be placed at all fence crossings.

2. If a natural barrier used for livestock control is broken during construction, the applicants will fence the area to prevent the drift of livestock. Fence specifications will be determined on a case-by-case basis.

WATER

1. All river, stream, and wash crossings required for access to project facilities will be at existing roads or bridges, except at locations designated by the authorizing agency official. Culverts or bridges will be installed at points where new permanent access roads cross live streams to allow unobstructed fish passage. Where temporary roads cross drainages or dirt fills, culverts will be installed and removed upon completion of the project. Any construction in a perennial stream is prohibited unless specifically allowed by the authorized officer. All stream channels and washes will be returned to their natural states.

2. Construction plans for crossing streams by boring, driving, or trenching will be approved by the authorized officer.

3. A buffer strip of terrestrial vegetation above the high water line will be left between work areas next to the stream and the stream itself.

4. In streams, construction will be planned to coincide with low water flows.

5. The applicant will complete the work and return the stream to its natural state as soon as possible.

6. Streambanks will be returned as nearly as possible to their original condition.

7. Backfill material for the pipe in the streambed will be of predominantly coarse material.

WASTE

1. Construction equipment must be refueled and maintained outside of stream channels in areas designated by the authorizing agency official.

2. Garbage and other refuse will be disposed of in an authorized disposal site or landfill. Engine oil changed on federal lands will be contained in suitable containers and disposed as refuse; no fuel, oil, or other hydrocarbon spills are permitted. If such a spill accidentally occurs, the authorized officer will be notified immediately and corrective measures undertaken as directed.

3. Within 30 days after the end of construction and operation, all construction materials and related litter and debris will be disposed of according to instructions of the authorized officer.

VEGETATION

1. Vegetation cleared during construction, operation, maintenance, or other activity will be disposed of as directed.

2. Commerical trees cut will be measured and paid for.

3. Disturbed areas, which in the opinion of the authorizing agency are unsuitable for successful revegetation, will be protected under the reclamation, erosion control, and revegetation provisions of the COM plan. This plan will state the method of protection to be used and the provisions for prevention of site deterioration and introduction of noxious weeds. At a minimum, the COM plan will include the reclamation, erosion control, and revegetation items decribed in Appendix A-7 for all federal land.

4. Preclearing of mountain brush and tree-covered areas before bulldozer and maintenance blade work will be required.

SOILS

1. Existing soils and geological data will be gathered and used to achieve maximum revegetation and soil erosion mitigation responses.

2. Areas subject to mudflows, landslides, mudslides, avalanches, rock falls, and other types of mass movement will be avoided where practical in locating linear facilities. Where such avoidance is not practical, the design, based upon detailed field investigations and analysis, will provide measures to prevent mass movements.

3. All topsoil and suitable plant growth material on federal lands will be conserved for reclamation requirements; excess topsoil will be stockpiled at designated locations.

4. All disturbed areas will be landscaped and revegetated as nearly as possible to their original conditions or to a condition agreed upon by both the applicant and the authorizing agency official. This reclamation will be accomplished as soon as possible after the disturbance.

5. The reestablishing of vegetation cover and establishing of watershed stabilization measures will be completed during the ongoing working season and before the next winter season.

6. Trees and brush (indigenous species) will be established according to the revegetation, erosion control, and rehabilitation plan within the COM plan.

7. Where soil surface is modified or natural vegetation removed, noxious weeds will be controlled.

8. Clearing for linear facilities in timber areas to reduce fire hazard will be limited to the lease conversion or other authorized area. Stumps will not be higher than 6 inches. The trees will be limbed and stacked next to the edge of the clearing. Slash will be spread over the area or where designated by the authorized officer.

9. Fire control provisions will be included in the COM plan. The applicant will do everything reasonably possible, both independently and upon request of the authorized officer, to prevent and suppress fires on or near the lease conversion area, including providing such construction, operation, and maintenance force as may be reasonably obtained for fire suppression.

VISUAL RESOURCES

1. A plan to lessen visual impacts will be required as a part of the COM plan. The applicants will design and locate the lease conversion elements to blend into the existing environment so as to most nearly meet the minimum degree of contrast acceptable for the Visual Resource Management class in which the structures would be placed. The authorizing agency will evaluate and approve measures before construction begins.

2. Edges of vegetation clearings will be feathered where feasible to avoid straight lines.

CULTURAL RESOURCES

All significant cultural resources known in the project area will be avoided wherever possible. For significant cultural resources that cannot be avoided, a memorandum of agreement with the Advisory Council on Historic Preservation and the Utah State Historic Preservation Office will be developed to detail specific mitigation in accordance with 36 CFR 800. All cultural resources discovered during construction will be left undisturbed until they can be evaluated for significance.

PALEONTOLOGY

The applicant will provide a qualified paleontologist who is approved by the authorized officer. The paleontologist will conduct an intensive survey of all areas to be disturbed according to the significance and mitigation needs specified by the applicants. The paleontologist can be consulted as needed during surface disturbance. If the paleontologist believes that paleontological values specified by the applicants would be disturbed, construction will be halted until appropriate action can be taken.

WILDLIFE

1. Although developing the proposed lease conversions may harm threatened or endangered species,

the current project descriptions lack enough information to fully determine whether the developments would jeopardize the existence of any of these species in the region. This statement particularily applies to eventual water use from the Colorado River system in relation to endangered fish. Therefore, BLM would need to request Section 7 (Endangered Species Act) consultation with the Fish and Wildlife Service (FWS) on a project-by-project basis as each plan of operations is reviewed for approval. Each converted lease would contain the following special provision in order to avoid a Section 7 jeopardy biological opinion:

> "The lessee will develop a detailed plan of operations which will fully protect listed or proposed threatened or endangered species and will submit the plan to BLM for formal consultation with FWS as required by Section 7 of the Endangered Species Act. The plan must cover species occurring on site as well as those off-site species which may be adversely Impacted. Consultation must be completed before the irreversible or irretrievable committment of resource or funds for on-the-ground development.
>
> This lease is issued and accepted with the express agreement that such consultation may require adjustments to the plan of operations, addition of special conservation measures, or limitations to the project in order to assure compliance with such provisions of the Endangered Species Act as may be applicable as determined by FWS at the time of development."

2. Any active golden eagle nest within 1 mile of project activities will have to be protected from harassment during the critical nesting period in accordance with provisions established by the Bald Eagle Protection Act.

PESTICIDES

Applicable federal and state laws and regulations concerning the use of pesticides (insecticides, herbicides, fungicides, rodenticides, and other similar substances) will be complied with in all operations. The applicants will obtain program approval from the authorizing agency before the use of such substances. The program request will provide the type and quantity of material to be used; the pest, insect, fungus, or other organism to be controlled; the method of application; the location of storage and disposal of containers; and other information that may be required. The request will be submitted by December 1 of the year before the start of the fiscal year (beginning October 1) for which the activities are proposed (i.e., December 1, 1984, deadline for a fiscal year 1985 action). Emergency use of pesticides will be approved by the authorizing agency. A pesticide will not be used if the Secretary of the Interior or the Secretary of Agriculture has banned its use. A pesticide will only be used in accordance with its registered uses and with other secretarial limitations. Pesticides will not be permanently stored on federal lands.

CORPS OF ENGINEERS

The Corps of Engineers (COE) has prescribed management practices that will be followed to the greatest extent practical for discharges covered by the Nationwide Permit (items 1 through 8 below). Additionally, certain conditions (33 CFR 330) must be met under the Nationwide Permit authority (items 9 through 17 below). For further detail, see the COE Permit Program "A Guide For Applicants," November 1, 1977.

1. Discharges of dredged or fill material into United States water will be avoided or reduced through the use of other practical alternatives.

2. Discharges in spawning areas during spawning seasons will be avoided.

3. Discharges will not be allowed to restrict or impede the movement of aquatic species indigenous to the waters, impede the passage of normal or expected high flows, or cause the relocation of the waters (unless the main purpose of the fill is to impound waters).

If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water the restriction of its flow will have to be minimized.

5. Discharges in wetland areas will be avoided.

6. Heavy equipment working in wetlands will be placed on mats.

7. Discharges into breeding and nesting areas for migratory waterfowl will be avoided.

8. All temporary fills will be entirely removed.

9. Preconstruction bottom contours cannot be changed. (Excess material will be removed to an upland disposal area.)

10. The discharge cannot occur close to a public water supply intake.

11. The discharge cannot occur in areas of concentrated shellfish production.

12. The discharge cannot destroy a threatened or endangered species as designated under the Endangered Species Act or endanger the critical habitat of such species.

13. The discharge cannot disrupt the movement of those species of aquatic life indigenous to the waterbody.

14. The discharge will consist of suitable material free from toxic pollutants in other than trace quantities.

15. The fill created by a discharge will be properly maintained to prevent erosion and other nonpoint sources of pollution.

16. The discharge will not occur in a component of the National Wild and Scenic River System or in a component of a state wild and scenic river system.

17. No access roads, fills, dikes, or other structures will be built below the ordinary high-water level of the streams under the Nationwide Permit. These structures would require separate Section 404 permits.

STATE OF UTAH

1. Each applicant is required by Utah Code Annotated Section 63-51-10 (Supp. 1981) to submit a financial impact statement and plan to alleviate socioeconomic impacts. Approval of each applicant's plan will be required before issuance of any state permits required to start construction.

2. The Utah Division of Oil, Gas, and Mining (UDOGM), within the Department of Natural Resources and Energy, has responsibility for issuance of permits or approval lettters for intention to commence mining operations for non-coal minerals excluding sand and gravel operations, under the authority of the Utah Mined Land Reclamation Act, 1975. The purpose of this permit is to ensure protection of the environment before, during, and following mining.

Operation requirements:

- mine development and reclamation must proceed in accordance with the approved plan
- an annual report (Form MR-3) must be filed.

3. The Utah Division of State Lands and Foresty (UDSLF), within the Department of Natural Resources and Energy, has responsibility for issuing right-of-way/right-of-entry permits under the authority of Utah Code Annotated, 1953, Title 65. The purpose of this permit is to protect the environment and prevent illegal entry to state lands. Operations Requirements:

- Following approval, permittee must fully comply with all stipulations.
- Federal specifications will apply to the state lands where federal lands are also involved and a federal right-of-way permit has been granted.

4. The Utah Division of Environmental Health (UDEH), Bureau of Air Quality, within the Department of Health, has responsibility for approving air pollution sources, under the authority of the Utah Air Conservation Act. The purpose of this permit is to prevent air pollution by any air pollution source except comfort heating.

Operations Requirements:

- No operating permit is required.
- Periodic inspection must be completed to ensure compliance with permit requirements.
- Periodic source testing must be conducted at the source's expense.

5. The UDEH, Bureau of Hazardous Wastes and Radiation, within the Department of Health, has responsibility for approving plans for hazardous waste management, treatment, storage and disposal facilities, under the authority of the Utah Solid and Hazardous Waste Act. The purpose of the permit is to prevent faulty construction of these facilities that may constitute hazardous conditions.

National Pollutant Discharge Elimination System program administration with the U.S. Environmental Protection Agency.

7. Utah Wastewater Disposal Regulations (State of Utah, 1978) protect designated beneficial uses of state waters against controllable pollution.

APPENDIX A-4
UNCOMMITTED MITIGATION MEASURES

The following mitigation measures were devised during impact analysis to further alleviate or reduce potential environmental effects from the proposed developments. These measures, however, are not committed to by the federal agencies or the applicants. They are presented as additional information for voluntary use by applicants or for use by authorizing officials in eventual permit stipulation. These uncommitted measures are presented below by resource. For those resources not listed, see the appropriate appendix for more measures.

WATER

1. Clean sediment from all detention ponds after spring runoff, significant storms, and prior to winter.

2. Develop springs (installing horizontal drain) to augment flow.

3. Treat excess process water and waters originating from the mined areas to maintain quality at preproject levels.

SOCIOECONOMICS

Each applicant is required by Utah Code Annotated Section 63-51-10 (Supp. 1981) to submit a financial impact statement and plan to alleviate socioeconomic impacts. Actual mitigation plans would be developed through negotiations among the applicants, state agencies, and local goverments. The following items should be considered for inclusion in such plans.

1. Provide single family homes, trailer sites, and mobile homes for sale or lease to employees at an affordable cost to mitigate expected housing shortages.

2. Formally guarantee the sale of housing units that would be built by local developers to provide an incentive for increased housing.

3. Formally guarantee rental commitments of units to be built by local developers to provide an increased supply of housing.

4. Provide funds for local planning positions to allow careful planning and mitigation of community impacts.

5. Provide funding for such service positions as policemen or social workers to encourage an adequate supply.

6. Provide low-interest loans with delayed payments until revenues increase. Such loans would eliminate the problem of lag time between when community expenditures are needed and when increased revenues begin.

7. Establish a housing office to help place workers in existing housing units.

8. The proposed synfuels projects establish proceedures that could include creation of a job training program. Such aid would be used to support (1) vocational skills training and (2) an affirmative action hiring plan.

9. Monitor work camp populations and agreements to ensure that any significant variations from projected occupancy would be incorporated into the mitigation planning under Utah Code Annotated Section 63-51-10 (Supp. 1981).

WILDLIFE

1. In areas of crucial wildlife habitat, apply range improvement practices to increase carrying capacities in adjacent areas before habitat disturbances by tar sand development.

2. Conduct training and educational programs to acquaint company workers with wildlife programs and the need for firearm control to create a greater respect for wildlife and reduce poaching.

3. Increase the forage productivity of lands next to irreversibly committed areas to make up for acres lost.

4. During peak construction and operation years, the companies could jointly finance two more temporary wildlife conservation officers (game wardens) for the local region. After construction declines, one permanent officer could be funded for the life of the project or as determined by UDWR.

5. The companies and their contractors could consider conviction of a job-related game violation as grounds for dismissal.

6. The companies could prohibit guns on all project sites.

7. The Utah Division of Wildlife Services could apply such measures to mitigate the increase in regional human population as limiting the number of hunting licenses, decreasing the length of hunting and fishing seasons, imposing smaller bag limits, applying limited-quota hunting, increasing the stocking of local streams, and more strictly enforcing existing game and fish laws. These measures could control but not eliminate significant secondary impacts to wildlife.

8. The following baseline studies are essential to help mitigate wildlife losses in the Sunnyside area:

STUDY DESCRIPTION: MULE DEER MIGRATION AND MOVEMENT CORRIDOR IDENTIFICATION/TELEMETRY STUDY

Justification: Migration corridors between summer and winter range have not been identified. Disrupting these traditional routes could cause large habitat areas (summer and winter) to be inaccessible by mule deer. Impacts to small areas could potentially impact much larger areas.

Movement corridors within the summer range may be as important as migration corridors between summer and winter range. With potential development, the scale proposed for tar sand, disruption of movement corridors could make inaccessible significant portions of the summer range.

STUDY DESCRIPTION: MULE DEER FAWNING AREA IDENTIFICATION/TELEMETRY STUDY

Justification: Fawning areas have not been identified. These areas consist of a unique combination of forage, cover, and water, which is often limiting. Loss of these habitat types would cause much greater impacts than loss of similar acreage of another habitat.

STUDY DESCRIPTION: SAGE GROUSE STRUTTING GROUND INVENTORY/AERIAL SURVEY

Justification: Six strutting grounds are known in the affected area. Because of poor accessibility to areas where strutting would occur and the presence of highly suitable habitat where strutting grounds have not been found, an aerial survey is believed to be warranted.

STUDY DESCRIPTION: RAPTOR NESTING INVENTORY (RAPTOR SPECIES OF HIGH FEDERAL INTEREST)/AERIAL SURVEY

Justification: Two golden eagle nest sites have been found in the affected area, but these nests were opportunistic sitings. No raptor inventory has been conducted in the affected area. The known golden eagle nests show that suitable habitat exists and that an inventory is warranted.

STUDY DESCRIPTION: AQUATIC SPECIES INVENTORY ON UPPER DRY CREEK/ELECTROSHOCKING SURVEY

Justification: Observations in 1981 suggest that portions of Dry Creek, Flat Canyon, and Jack Creek that cross the tract are perennial. Therefore, a potential cold water fishery exists. Because of the isolation of this portion of Dry Creek, the Colorado cutthroat, a BLM sensitive species, could occur.

VISUAL RESOURCES

ROADS

1. Use existing roads as much as possible to maintain existing visual resource quality and lessen other environmental impacts.

2. When building new roads or rebuilding existing roads, reduce the width of roads, keeping safety in mind, to lessen the impact on visual and other resources.

3. Keep road cuts and fills to a minimum when building new roads or upgrading existing areas to minimize the contrast in landform modification and visual resouce contrasts.

4. Double cut ends of culverts to match the road cut slopes, or use preformed end sections when installing culverts for roads in visually high or medium sensitive areas to reduce the visual contrast when adding a structure to the landscape.

TRANSMISSION/DISTRIBUTION LINES

1. Do not clear vegetation for transmission line construction unless the existing vegetation would directly interfere with the building or operation of the structures in high or medium visually sensitive areas. Less clearing would reduce the vegetation contrasts in form, line, color, and texture with the natural landscape.

2. Where possible, connect vegetation clearings for transmission line construction and operation with existing natural clearings, even if extra clearing would be reasonably necessary to reduce the form, line, color, and texture contrasts with the natural vegetation.

3. Plan transmission line corridors to lessen introduced visual contrasts of the structures with the existing visual landscape by screening or blending transmission line characteristics where possible.

FACILITIES

1. Choose building materials, colors, and overall designs for facilities in high or medium visual sensitive areas to help the facility blend with the surrounding landscape.

2. Locate facilities when possible to minimize visual contrast by taking advantage of landforms and vegetation patterns.

3. Where feasible, remove and save topsoil for redistribution when building facilities so that the site can more easily revegetate when construction is complete.

4. Reduce vegetation removal when building facilities, or in a few cases clear more vegetation to blend clearings with the existing landscape and help reduce visual contrasts.

PIPELINES

1. Pipeline (or conveyor) clearings should appear natural, blending with natural vegetation clearings and patterns, or where possible, pipelines should be placed along existing roads to reduce visual contrasts with the natural landscape.

2. Where subsoil colors differ from surface soil colors and the visual sensitivity is high or medium, use proper trenching and backfill techniques to replace soils so that color contrasts do not result in lessening the visual quality of an area.

MISCELLANEOUS

1. Where feasible, revegetate with indigenous plants, using on-site transplants, as an example, to help avoid long-term visual contrasts with the natural landscape. (For more information on revegetation, see Appendix A-7, Reclamation and Erosion Control Programs.)

2. Plan uniformity in signing (highway, recreation, information) to reduce visual contrasts by establishing harmony in signing.

TRANSPORTATION NETWORKS

1. Where feasible, implement a comprehensive ride-sharing program that would include the use of car pools, van pools, and buses to carry construction and operation workers.

2. Stagger work hours.

3. In a cooperative venture between the applicant and the roadway agency, install signal lights at the high-volume traffic intersections—State Road (SR) 123 and SR 124; SR 123 and US 6.

4. Where major public access routes are blocked by development, require applicants to provide alternative access routes.

5. Where specific road segments are below level-of-service C, upgrade them to a level of C or above. This upgrading will change traffic from an unstable to a stable flow and could reduce accidents.

AGRICULTURE

CROPLAND

To reduce the impact of cropland conversion to urban uses, avoid building homesites and other support facilities for project-related population increases on irrigated cropland.

APPENDIX A-5
WATER RESOURCES

SPECIAL WATERSHED MANAGEMENT AREAS AND RELATED REGULATIONS

Within the main block of the Sunnyside Special Tar Sand Area (STSA) are 4 special watershed management areas (Map 3-1, map pocket). These areas have been withdrawn, or restricted from certain types of uses, to protect the water resources of the area. The special watershed management areas are:

- 2,400 acres of public lands set aside as a water supply reserve for Sunnyside, Utah. Authorized by Public Law No. 294, January 7, 1921.
- 3,680 acres of public lands withdrawn as a public water reserve. Authorized by Order of Withdrawal No. 16, March 9, 1914.
- 2,000 acres of Range Creek Watershed, designated by the Bureau of Land Management (BLM) as an area containing topographic features and water resources worthy of protection from surface disturbance.
- 1,440 acres of Bear and Rock Creeks Watershed designated by the BLM as an area containing topographic features and water resources worthy of protection from surface disturbance.

January 7, 1921.
[S. 46.]
[Public, No. 294.]

CHAP. 13.—An Act For the protection of the water supply of the town of Sunnyside, Utah.

Public lands.
Set aside as water-supply reserve for Sunnyside, Utah.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the public lands within the several townships and subdivisions thereof hereinafter enumerated, situated in the county of Carbon and State of Utah, are hereby reserved from all forms of location, entry, or appropriation, whether under the mineral or nonmineral land laws of the United States, and set aside as a municipal water-supply reserve for the use and benefit of the people of the town of Sunnyside, a municipal corporation of the State of Utah, as follows, to wit: The south half of south half of section thirty-four, in township thirteen south, range fourteen east, Salt Lake base and meridian; and also the following lands which, when surveyed, will be described as follows, to wit: All of section eleven; west half of section twelve; all of section thirteen; and all of section fourteen, in township fourteen south, range fourteen east, of Salt Lake base and meridian.

Description.

Secretary of the Interior to cooperate in administration, etc., of.

SEC. 2. That the lands heretofore described and reserved for municipal water-supply purposes shall be administered by the Secretary of the Interior, in cooperation with and at the exclusive expense of the town of Sunnyside, Utah, for the purpose of storing, conserving, and protecting from pollution the said water supply, and preserving, improving, and increasing the timber growth on said lands, to more fully accomplish such purposes; and to that end said municipality shall have the right, subject to the approval of the Secretary of the Interior, to the use of any and all parts of the lands reserved for the storage and conveying of water and construction and maintenance thereon of all improvements for such purposes: *Provided,* That deposits of coal or other minerals in the lands reserved by this Act may be leased or otherwise disposed of by the Secretary of the Interior under laws applicable to such deposits, if and when he shall find that same may be mined and removed without injury to the municipal water supply of Sunnyside, Utah.

Rights conferred.

Proviso.
Mineral deposits.

Regulations, etc.

SEC. 3. That the said Secretary of the Interior is hereby authorized to prescribe and enforce such regulations as he may find necessary to carry out the purpose of this Act, including the right to forbid persons other than those authorized by him and the municipal authorities of said municipal corporation from entering or otherwise trespassing upon these lands, and any violation of this Act or of regulations issued thereunder shall be punishable as is provided for in section 50 of the Act entitled "An Act to codify, revise, and amend the penal laws of the United States, approved March 4, 1909" (Thirty-fifth Statutes at Large, page 1098), as amended by the Act of Congress approved June 25, 1910 (Thirty-sixth Statutes at Large, page 857).

Enforcement.
Vol. 35, p. 1098.

Vol. 36, p. 857.

Prior rights, etc., reserved.

SEC. 4. That this Act shall be subject to all legal rights heretofore acquired under any law of the United States, and the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 7, 1921.

January 7, 1921.
[S. 429.]
[Public, No. 295.]

CHAP. 14.—An Act To authorize an exchange of lands with Henry Blackburn.

Sevier National Forest, Utah.
Lands exchanged with Henry Blackburn for.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is hereby authorized to accept title to the southwest quarter of the southeast quarter of section nineteen, township thirty-nine south, range six west, Salt Lake meridian, and to convey in exchange therefor to Henry Blackburn, of Orderville, Utah, title to the northeast quarter of the northeast quarter of section thirty, township

STATE OF UTAH WATER CLASSIFICATION

2.6 USE DESIGNATIONS

The Committee and Board, as required by 73-14-6 and 63-46-1 through 13, Utah Code Annotated 1953, as amended, shall group the waters of the state into classes so as to protect against controllable pollution the beneficial uses designated within each class as set forth below. Waters of the state are hereby classified as shown below.

2.6.1 Class 1—protected for use as a raw water source for domestic water systems.

A. Class 1A—protected for domestic purposes without treatment.

B. Class 1B—protected for domestic purposes with prior disinfection.

C. Class 1C—protected for domestic purposes with prior treatment by standard complete treatment processes as required by the Utah State Division of Health.

2.6.2 Class 2—protected for in-stream recreational use and aesthetics.

A. Class 2A—protected for recreation bathing (swimming).

B. Class 2B—protected for boating, water skiing, and similar uses, excluding recreational bathing (swimming).

2.6.3 Class 3—protected for in-stream use by beneficial aquatic wildlife.

A. Class 3A—protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.

B. Class 3B—protected for warm water species of game fish and other water water aquatic life, including the necessary aquatic organisms in their food chain.

C. Class 3C—protected for non-game fish and other aquatic life, including the necessary aquatic organisms in their food chain. Standards for this class will be determined on a case-by-case basis.

D. Class 3D—protected for waterfowl, shorebirds, and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.

2.6.4 Class 4—protected for agricultural uses including irrigation of crops and stockwatering.

2.6.5 Class 5—protected for industrial uses including cooling, boiler make-up, and others with potential for human contact or exposure. Standards for this class will be determined on a case-by-case basis.

2.6.6 Class 6—protected for uses of waters not generally suitable for the uses identified in Sections 2.6.1 through 2.6.5, above. Standards for this class will be determined on a case-by-case basis.

2.7 WATER QUALITY STANDARDS

2.7.1 Application of Standards

The standards listed in the **Wastewater Disposal Regulations** (State of Utah 1978) shall apply to each of the classes assigned to waters of the State as specified in Section 2.6 of these regulations. It shall be unlawful and a violation of these regulations for any person to discharge or place any wastes or other substances in such manner as may interfere with designated uses by assigned classes or to cause any of the applicable standards to be violated, except as provided in Section 1.3.1.

2.7.2 Narrative Standards

It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum, or other nuisance such as color, odor, or taste; or conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or

concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, as determined by bio-assay or other tests performed in accordance with standard procedures determined by the Committee.

2.8 PROTECTION OF DOWNSTREAM USES

All actions to control waste discharges under these regulations shall be modified as necessary to protect downstream designated uses.

2.9 INTERMITTENT WATERS

Failure of a stream to meet water quality standards when stream flow is either unusually high or less than the 7-day, 10-year minimum flow shall not be cause for action against persons discharging wastes which meet both the requirements of PART I of these regulations and the requirements of PART I of these regulations and the requirements of applicable permits.

2.10 LABORATORY AND FIELD ANALYSES

2.10.1 Laboratory Analyses

All laboratory examinations of samples collected to determine compliance with these regulations shall be performed in accordance with standard procedures by the Utah Division of Health Laboratories or by a laboratory certified by the Utah Division of Health.

2.10.2 Field Analyses

All field analyses to determine compliance with these regulations shall be conducted in accordance with standard procedures specified by the Utah Division of Health.

2.11 PUBLIC PARTICIPATION

Public hearings will be held to review all proposed revisions of water quality standards, designations and classifications, and public meetings will be held for case-by-case consideration of discharge requirements set to protect water uses under assigned classifications. All meetings shall comply with the provisions of Section 63-46-1 through 13, **Utah Code Annotated** 1953, as amended.

DETERMINATION OF CURRENT SEDIMENTATION RATE IN GRASSY TRAIL RESERVOIR

- Drainage area 17.2 square miles (mi^2)
- Reservoir capacity 55 acre-feet (ac-ft) sediment storage plus 861 ac-ft water capacity equals total of 916 ac-ft
- Built and filled in 1952, 30 years old
- Sediment density, 70 pounds per square foot
- Trap efficiency:

reservoir capacity in WS inches =

$$0.08175 \times \frac{916 \text{ ac-ft}}{17.2 \text{ mi}^2 \text{ drainage area}} = 4.35$$

average runoff in WS inches = 6" Hydrologic Inventory of Price River Study Unit, 1975, Utah Division of Natural Resources, Division of Water Resources

capacity/inflow ratio, C/I = $4.35 \div 6 = 0.73$

- currently has 200 ac-ft of sediment (Utah Fish and Game Survey 1981)

Sediment Trapped Per Year

200 ac-ft sediment $\div$ 29 years = 6.9 ac-ft/yr

$6.9 \times 43{,}560 = 300{,}564\ \text{ft}^3/\text{yr} \times 70\ \text{lbs/ft}^3 = 21{,}039{,}480\ \text{lbs} \div 2000 = 19{,}520\ \text{ton/yr}$

Sediment Delivered Per Year

If 10,520 = 80%, then 100% = 1,350 ton/yr

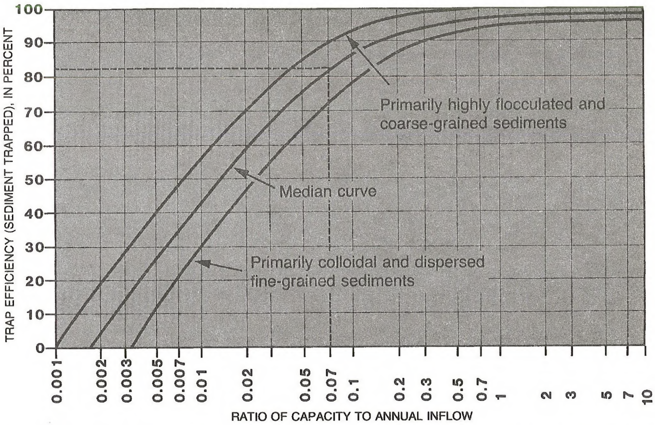

FIGURE A5-1 TRAP EFFICIENCY OF RESERVOIRS

Source: USDA, SCS National Energy Handbook, Technical Release #12, 1975.

APPENDIX A-6
SOCIOECONOMICS

AREA OF INFLUENCE

The area of influence for socioeconomics includes Carbon and Emery counties in Utah. This area was determined by comparing population levels under the baseline condition with population impacts expected for the proposed actions. Only those Census County Divisions (CCDs) and communities that had a projected 5 percent or greater increase in population over the baseline in the year 2005 (the date when the largest population growth would occur for the proposed actions and alternatives) are included in the detailed analysis. The following places did not meet that criterion:

Carbon County: Unincorporated areas of East Carbon CCD

Hiawatha
Scofield

Emery County: Emery-Ferron CCD

The Uintah and Ouray Indian Reservation is located in the adjacent counties of Duchesne, Grand, and Uintah counties. This reservation is a sovereign government entity with specific jurisdiction and responsibilities administered by the Ute Indian Tribal Council. Because of natural barriers that impede commuting, neither these counties nor the reservation is expected to be significantly affected by tar sand development in the main block of the Sunnyside STSA, and they are not included in the detailed analysis.

ADJUSTMENTS METHODOLOGY

The following adjustments methodology was used to estimate impacts during the peak construction year of 1989. Those estimates were not included in the technical report analysis because of the need to maintain a consistent set of "window" years throughout the analysis of all the Utah STSAs to obtain cumulative and comparative results. For the Sunnyside site-specific analysis, estimates of the peak construction impacts were needed, and this additional step provided these estimates. Although these estimates represent less depth of analysis that those for the other years, the omission of these estimates would have been a more serious deficiency.

The adjustment method derived ratios between primary and secondary employment and between total employment and population separately for construction and operation. This method was made possible by the fact that in 1985 and 2005 all of the primary employment is in one of the sectors. The procedure has four steps for each set of ratios. (This description is for the secondary employment/primary employment ratios.)

1. Calculate the construction ratio for 1985 and the operation ratio for 2005.
2. Use those ratios to estimate construction- and operation-related total employment in 1990, 1995, and 2000.
3. Force the estimates in step 2 to equal actual total employment in 1990, 1995, and 2000.
4. Divide the construction-related and operation-related total employment derived in step 3 by the respective primary employment figures to obtain ratios for 1990, 1995, and 2000.

The calculations are as follows:

	1985	1990	1995	2000	2005
Primary employment: construction	A	B	C	D	-
operation	-	E	F	G	H
Total employment	I	J	K	L	M

Step 1: $I/A = a$ $M/H = h$

Step 2: $a \times B = B'$ $h \times E = E'$
$a \times C = C'$ $h \times F = F'$
$a \times D = D'$ $h \times G = G'$

Step 3: $J/(B' + E') = j$ $K/(C' + F') = k$ $L/(D' + G') = l$
$j \times B' = B''$ $k \times C' = C''$ $l \times D' = D''$
$j \times E' = E''$ $k \times F' = F''$ $l \times G' = G''$

Step 4: $B''/B = b$ $C''/C = c$ $D''/D = d$
$E''/E = e$ $F''/F = f$ $G''/G = g$

Population/total employment ratios were derived in the same manner, using the forced estimates of construction-related and operation-related total employment from step 3 (items B″- G″) for 1990, 1995, and 2000 (items B–G). Households and personal income ratios were also derived in the same manner (using primary employment × average annual wage = total primary personal income by sector).

Ratios for the proposed actions and the interrelated projects were used to make the adjustments. Ratios calculated for the partial conversion and unitized development alternatives proved to be either similar to the proposed actions or at variance due to small numbers. Estimates for the interrelated projects in the peak construction year of 1989 were made using the work force figures for that year and the 1990 ratio. Baseline estimates were obtained by interpolating between 1985 and 1990.

Allocation ratios to the communities were derived from the technical report figures for each analysis year. Allocations for population and households proved to be similar, so the population allocations were used for both. One change that was made from the technical report procedure was to allocate to the counties first, using employment allocation ratios, and then to sub-allocate to the communities in each county.

Adjustments to the community services and facilities impacts use the adjusted population figures and standards derived from the infrastructure service demands tables (Tables 4.20 and 4.21) in the technical report. For each service and facility, the collective and cumulative adjusted population impact was multiplied by the standard to obtain the demand, which was then compared by percentage to the respective baseline demand given in the technical report. Baseline estimates for 1989 were obtained by interpolating between 1985 and 1990.

APPENDIX A-7
RECLAMATION AND EROSION CONTROL PROGRAMS

Successful restoration, reclamation, and erosion control on lands disturbed by project development and operation in the Sunnyside Special Tar Sand Area (STSA) would require an intensive reclamation program. As part of the overall impact evaluation for the projects, site-specific environmental constraints have been compared to agency land use objectives and to reclamation plans proposed by each of the applicants. Environmental constraints were determined from site-specific soil surveys, vegetation surveys, literature reviews, and interviews with agency specialists. Land use objectives were determined from existing practices and plans of agency personnel and the Range Creek Unit Resource Analysis (BLM 1980b).

The following environmental variables influence reclamation success in the region: (1) climatic conditions (Map 3-2, map pocket of draft EIS); (2) soil properties, such as shallow depths, thin surface layers, low inherent fertility, and large volumes of rock fragments; (3) steep to very steep sloping terrain; and (4) the variation in vegetation types. Other variables that would influence reclamation success include livestock grazing control on restored and seeded areas and off-road vehicle (ORV) traffic control on access roads to lessen off-road land surface disturbance.

Reclamation in the past has not always been successful, due in part to inadequate reclamation practices or non-compliance with applicable reclamation practices and continuing follow-up measures. Reclamation efforts have been improving in recent years due to: (1) stronger emphasis on achieving successful reclamation to meet regulatory requirements; (2) a more dedicated stewardship commitment; (3) improved methods and plant varieties; (4) improved kinds of machinery to implement practices; and (5) stronger emphasis on compliance and monitoring programs.

TYPES OF LAND DISTURBANCE

Different kinds of land disturbance caused by project activities would require tailored reclamation programs. These programs include (1) reclamation and revegetation of land disturbed by surface facilities and installation of right-of-way facilities, such as pipelines, roads, and electric transmission lines; (2) reclamation and revegetation of spent sand disposal areas; (3) land restoration, reclamation, and revegetation of surface mined areas; and land disturbance caused by in-situ retorting processes; and (4) protection and reclamation of right-of-way areas subject to periodic construction disturbance due to common corridor use.

ASSUMPTIONS

To determine erosion control and reclamation success on lands disturbed by project construction and operation, the following assumptions were made:

(1) Applicants would comply with the proposed erosion control and reclamation programs they have developed and would follow through on their commitment to "comply with appropriate regulations and required plans and stipulations to protect and restore the land disturbed by project construction and operation to a stable, productive and aesthetically acceptable condition." The applicants' proposed erosion control and reclamation programs have been reviewed and evaluated and their adequacy and effectiveness determined. More mitigation has been identified where necessary (see the Review and Evaluation of Applicants' Proposed Programs section of this appendix for details).

(2) Applicants operating on Utah State land would prepare and follow appropriate plans, including measures to accomplish and ensure successful reclamation of state land affected by project construction and operation, as required by the Utah State Department of Natural Resources, Division of Oil, Gas, and Mining (State of Utah 1982).

(3) Applicants would comply with soil protection and land use goals identified by the landowner on private lands.

(4) Results of the third order soil survey and special studies accurately assess local conditions and potential for reclamation success. Some applicants have conducted detailed soil and vegetation inventories to provide more resource inventory data, to identify revegetation and reclamation potential, to determine reclamation measures and their effectiveness, and to identify source areas for favorable soil materials.

(5) The following "Erosion Control, Revegetation, and Restoration Guidelines for use on Federal Lands" would be included as stipulations in the right-of-way grants and mineral leases issued to the applicants by BLM and Forest Service and would also be implemented for all state and private lands, as agreed upon by the applicants and landowner.

For more assumptions, see the Surface Mining and Land Restoration Scenarios, Soil Reconstruction Potential, and Revegetation Potential sections of this appendix.

EROSION CONTROL, REVEGETATION, AND RESTORATION GUIDELINES FOR USE ON FEDERAL LANDS

The following guidelines would be included as stipulations in the right-of-way grants and mineral leases issued to the applicants.

As part of their standard procedures, the applicants would implement erosion control and revegetation measures to assure that lands disturbed by construction and operation would be restored to a stable, productive, and aesthetically acceptable condition.

A detailed, site-specific reclamation plan would be developed and become part of the construction, operation, and maintenance (COM) plan. Because the proposed rights-of-way and project component sites consist of many types of terrain, soils, vegetation, land uses, and climatic conditions, the detailed plan would include sets of techniques and measures tailored to each condition found. Local expertise and locally effective reclamation methods would be followed when developing the site-specific procedures for the detailed reclamation plan. The erosion control, revegetation. and restoration guidelines and COM plan would be implemented under the direction of the appropriate agency official.

Detailed information on applicable techniques and technical assistance for private landowners concerning erosion control measures and reclamation procedures would be obtained from the Soil Conservation Service (SCS) through local soil conservation districts. Technical assistance and approval of written plans for use on federal lands would be obtained from BLM before any construction.

During construction of applicant projects, an on-site reclamation specialist would be employed by the applicants to provide (1) liaison with private landowners, federal agency officials, and local governments; (2) expertise to direct restoration procedures to avoid construction delay when special conditions are encountered; and (3) favorable public relations.

General erosion control and restoration measures have been developed for the following areas and will be included as part of the COM plan:

- Right-of-Way and Site Clearing
- Trenching, Surface Mining, Preservation of Topsoil (Favorable Plant Growth Material), and Overburden Handling
- Backfilling and Grading
- Land Preparation for Seeding and Cultivation
- Revegetation (Reseeding and Planting)
- Maintenance and Monitoring
- Use of Biochemicals
- Construction Timing

RIGHT-OF-WAY AND SITE CLEARING

The following measures would be used during right-of-way and site clearing:

- Land would be graded only on the area required for construction.
- Sidehill cuts would be kept to a minimum to ensure resource protection and a safe and stable plane for efficient equipment use. The authorizing agency would provide assistance for and approve sidehill cuts to construction.
- Existing ground cover such as grasses, leaves, roots, brush, and tree trimmings would be

cleared and piled only as needed. Slash would be piled and later shredded and chipped for use in restoration or disposed of at the discretion of the authorizing agency.

- Trees and shrubs on the right-of-way and surface mine areas that are not cleared would be protected from damage during construction, operation, and maintenance.

- Where the right-of-way crosses streams and other water bodies, the banks would be stabilized to prevent erosion. Construction techniques would lessen damage to shorelines, recreational areas, and fish and wildlife habitat.

- Care would be taken to avoid oil spills and other types of pollution in all areas, including streams and other water bodies and their immediate drainage areas. All spills would be immediately cleaned up.

- Design and construction of all temporary roads would be based on an approved transportation plan and would ensure proper drainage, reduce soil erosion, and preserve topsoil. After abandonment, these roads would be closed and areas restored without delay or maintained at the discretion of the landowner. Restoration, including redistribution of topsoil, would be to the satisfaction of the landowner, authorizing agency, or both.

- During adverse weather, as determined by the on-site reclamation specialist, the authorizing agency would issue stop and start orders to prevent rutting or excessive tracking of soil and deterioration of vegetation in the rights-of-way.

- During construction, surface mining, and reclamation of spent sand disposal areas near streams or lakes, sedimentation (detention) basins or straw bale filters would be built to prevent suspended sediments from reaching downstream water courses or lakes, as required by the authorizing agency.

- Construction would immediately follow clearing, especially where soils are subject to high wind or water erosion and in other special areas.

TRENCHING, SURFACE MINING, PRESERVATION OF TOPSOIL (FAVORABLE PLANT GROWTH MATERIAL), AND OVERBURDEN HANDLING

- On right-of-way facilities, mining areas, and spent sand disposal areas, topsoil and favorable plant growth material would be removed as specified by the authorizing agency. (These materials would be stored separately, protected, and replaced last during backfilling.)

- Remaining unearthed materials would be removed and stored to facilitate backfilling procedures, to use the least possible area, and to protect from erosion and vehicle and equipment traffic.

- Cofferdams or other diversionary techniques would be used, where needed, to permit flow in one part of a stream while pipelaying construction occurs in another.

- An excavated material stockpile procedure, developed by both the authorizing agency and applicant would be used on steep-sloping and rough, broken terrain to lessen disturbance.

BACKFILLING AND GRADING

- Backfill would be replaced in a sequence and density similar to the preconstruction soil condition.

- Backfilling would be done to minimize more vegetation disturbance.

- The contour of the ground would be restored to permit favorable surface drainage.

- In strongly sloping and steep terrain, erosion control structures such as water bars, diversion channels, and terraces would be built to divert

water from the pipeline trench and reduce soil erosion along the right-of-way and other adjoining areas that would be disturbed during construction.

- All structures such as terraces, levees, underground drainage systems, irrigation pipelines, and canals would be restored to preconstruction conditions so that they work as originally intended.

- Surface mining and spent sand disposal areas would be graded and shaped to allow adequate slope stability, soil erosion control, and establishment of vegetation cover.

- The surface would be graded to conform to the existing surface of the adjoining areas except for a slight crown over the trench to compensate for natural subsidence. In cropland areas, especially border-and furrow-irrigated cropland, the soils (backfill) within the trench would be compacted, and the crown smoothed to match the bordering area and to allow surface irrigation.

- Topsoil would be replaced evenly over the trench fill and other disturbed areas to restore productivity to the preconstruction condition.

- Materials that cannot be used for backfilling and excess backfill material would be disposed of as arranged by the authorizing agency.

- Temporary work space areas used at stream and highway crossings and other special sites would be restored to nearly preconstruction conditions and to the satisfaction of the authorizing agency.

- The right-of-way at stream crossings would be restored to a preconstruction state. The upland area and banks would be revegetated to preconstruction conditions, where possible, or mulched with rock. The rock mulch would have a larger diameter than materials excavated from the trench. The streambed would be returned to its original contours with sediments like those excavated.

LAND PREPARATION FOR SEEDING AND CULTIVATING

Construction, backfilling, and grading often cause compaction and alter soil conditions that affect soil productivity and seeding success. The following techniques would be used to improve soil conditions, protect soil from erosion, and provide a favorable seedbed:

- In cropland areas, as required by the authorizing agency or landowner, subsoiling or chiseling would be used to ensure that soil compaction is reduced and preconstruction soil permeability is restored.

- Chiseling would be used in rangeland areas to reduce compaction and improve soil permeability unless the landowner or authorizing agency objects. Pitting and contour furrowing, as directed by the authorizing agency or landowner, would be done on steeper slopes of disturbed areas to increase infiltration and reduce runoff and erosion.

- Suitable mulches and other soil stabilizing practices would be used on all regraded and topsoiled areas to protect unvegetated soil from wind and water erosion and to improve absorption.

- In critical areas where wind and water are serious erosion hazards, special mulching practices or matting would be needed to protect seeding, seedlings after germination, and plantings.

- Commercial fertilizers would be applied to soil areas with low inherent fertility to maintain crop yields and establish grass seedings. Fertilizer would be applied according to annual precipitation and amount of irrigation water.

- Seedbeds for areas seeded to grass would be prepared to provide a firm and friable condition suitable for establishing of grass stands.

- Rock mulches would be used in steep-sloping rock outcrop areas and low precipitation areas to reduce erosion and promote vegetation growth.

- Land would be prepared and cultivated on the contour in steeply sloping areas to lessen erosion.

- Soil areas with rock fragments, such as very coarse gravel, cobble, or scattered stone, would be restored to the original preconstruction surface condition to blend with the adjoining area, to avoid a smooth surface area, and to control accelerated erosion.

REVEGETATION (RESEEDING AND PLANTING)

To ensure successful revegetation, reseeding and planting procedures would be consistent with local climate and soil conditions and would follow the recommendations and directions of local experts. Revegetation efforts would be continued until a satisfactory vegetation cover is established. The following practices and techniques would be used in areas where reseeding is suitable as determined by the authorizing agency:

- A firm seedbed would be prepared before seeding and would include a mulch of plant residues or other suitable materials. A cover crop may be needed in larger disturbed areas.

- Seed would be planted by drilling, broadcasting, or hydroseeding. Drilling is the preferred method because it is usually successful. Drill seeding with a grass drill equipped with depth bands would be used where topography and soil allow operation of equipment to meet the seeding requirements of the species being planted. Broadcast seeding would be used for inaccessible or small areas. Seed would be covered by raking or harrowing. Critical areas would be hydroseeded as determined by the reclamation specialist or authorizing agency.

- Only species adaptable to local soil and climatic conditions would be used. Generally, these would be native species, but introduced species may be considered for specific conditions when approved by the landowner and authorizing agency. Seeding rates in critical areas would be increased by 100 percent over regular seeding rates, which would allow for seed mortality from adverse growing conditions.

- Seeds would be tested to meet state, federal, and authorizing agency seed requirements.

- Areas would be seeded when seasonal or weather conditions are most favorable and as determined by the landowner or authorizing agency.

- Grazing or mowing would be delayed at least one season after seeding to provide time for vegetation to become established, especially in highly erodible areas, unless the landowner or authorizing agency objects. Protective fencing may be needed in special areas and would be built, maintained, and removed according to authorizing agency specifications.

- In areas with low annual precipitation (generally less than 8 to 10 inches) where reseeding is not suitable or as successful as in higher precipitation areas, erosion control structures and measures would be applied on sloping areas that would reduce accelerated erosion, allow reestablishing of surface soils to preconstruction conditions, and allow natural revegetation.

- Trees and shrubs would be reestablished in areas as specified in the revegetation plan.

MAINTENANCE AND MONITORING

The applicant and authorzing agency would jointly inspect reclaimed areas to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing land for two growing seasons or for a period determined by the landowner on private land or by the authorizing agency on state or federal land. The monitoring program would identify problem areas and corrective measures to ensure vegetation cover and erosion control. The success of revegetation and erosion control would be determined by the landowner or authorizing agency.

USE OF BIOCHEMICALS

Biochemicals such as herbicides, fungicides, and fertilizers would be used according to state and federal laws, regulations, and policies. State and

federal wildlife agencies would be contacted if any biochemicals are to be applied on or near sensitive wildlife areas. These biochemicals would be applied using ground methods. Before the use of such substances on or near the permit or grant area, the applicant would obtain approval of a written plan for such use from the authorizing agency, landowner, and appropriate wildlife agency. The plan would outline the kind of chemical, method of application, purpose of application, and other information as required, and would be considered as the authorized procedures for all applications until revoked by the authorizing agency, landowner, or appropriate wildlife agency. This plan would become part of the COM plan.

CONSTRUCTION TIMING

Pipeline construction activities on irrigated cropland would be timed as much as possible to avoid disrupting irrigation delivery systems during the major irrigation season and to reduce effects on crop production in affected areas as well as in adjoining irrigated cropland areas served by the systems.

REVIEW AND EVALUATION OF APPLICANTS' PROPOSED PROGRAMS

Applicant erosion control, reclamation, and revegetation programs were reviewed and evaluated using information collected for the vegetation, soils, agriculture, and climate studies for the projects. The reclamation procedures were evaluated in separate phases by the type of land disturbance; potential problem areas; and conditions found in the vegetation, soils, and climatic inventories.

Table A-7-1 is the checklist that was used as a guideline for the review and evaluation of the erosion control, reclamation, and revegetation programs. The checklist summarizes effective and reliable measures essential for successful erosion control and reclamation. (The sources for these measures and procedures are shown on Table A-7-1.) A summary of each applicant's proposed erosion control and reclamation program is presented in the following individual project discussions.

AMOCO

Amoco outlined its erosion control and reclamation program in its proposed plan of operations and erosion control, restoration, and reclamation program supplements (1983). Amoco intends to follow the erosion control and reclamation guidelines and to restore all disturbance on federal, state, and private land. Even though no specific plan was addressed, Amoco's program identified measures that would be used to restore, reclaim, and revegetate land disturbance from surface mining (Table A-7-1).

Table A-7-1 Table A-7-1 (Continued) Table A-7-1 (Concluded)

The major concern regarding Amoco's restoration and reclamation program is that reclamation of the open pit would not start until the 20th year, when 3,000 acres would be unreclaimed. After 20 years, topsoil and overburden storage, handling, and replacement would be a problem. In addition, a larger area would be susceptible to accelerated erosion and remain vegetatively unproductive. These impacts are analyzed in Chapter 3. Mining and restoration should be designed to limit the unreclaimed area to less than 25 percent of the lease area. A reclamation program more concurrent with mining should be developed.

CHEVRON-GMC

The erosion control and reclamation program outlined in Chevron-GNC's proposed plan of operations (1982) is general and incomplete (Table A-7-1). Chevron's general statement reports the intent to protect and reclaim land disturbed by projects. Chevron-GNC has stated that it would develop a reclamation research program during mining to investigate effective plant species selection and reclamation techniques. Actually, this should be a reclamation effectiveness monitoring program. The objective should be to develop an effective erosion control and reclamation plan based on the research and experiences.

Chevron-GNC has proposed seed mixtures containing mainly introduced plant species. Adapted native species would be generally required, and introduced species would be considered for specific conditions when approved by the landowner and authorizing agency.

It is assumed that an adequate reclamation program would be implemented because of the intent identified, compliance with site-specific erosion control and reclamation plans approved by authorizing agencies, and compliance with the accompanying requirements and stipulations that are a part of the right-of-way grants and mineral leases for federal and state lands.

ENERCOR

The erosion control and reclamation program outlined in Enercor's proposed plan of operations (1982) identifies the intent to follow the erosion control and reclamation guidelines and to restore all land disturbance caused by project activities. Enercor's program addresses most of the measures specified in the checklist (Table A-7-1). Enercor's general provisions meet the objectives and intent of ensuring successful reclamation.

MONO

The erosion control and reclamation program presented in Mono's proposed plan of operations (1982) is thorough and adequate. Mono's program addresses the essential general procedures and the applicable measures specified in the checklist (Table A-7-1).

Mono has stated that native plant species would generally be seeded. Introduced species would be considered for specific conditions when approved by the landowner and authorizing agency.

Compliance with the reclamation program as outlined provides the needed measures to ensure successful erosion control and reclamation of land disturbance.

SABINE

The erosion control and reclamation program outlined by Sabine in its proposed plan of operations (1982) is general (Table A-7-1). Even though less land surface disturbance (no major soil and overburden alteration and no spent sand disposal reclamation) would occur, timely implementation of effective erosion control and reclamation measures would be needed to ensure successful erosion control and revegetation of land disturbed by in-situ extraction. The strongly sloping and steep terrain would require intensive implementation of erosion control and reclamation measures to protect and revegetate land disturbed by drill sites, pipelines, powerlines, and access roads.

Implementation of an adequate reclamation program is assumed because of the intent identified and because of the necessary compliance with site-specific erosion control and reclamation plans approved by authorizing agencies, and compliance with the accompanying requirements and stipulations that are a part of the right-of-way grants and mineral leases for federal and state lands.

SOILS

A third-order soil survey (SCS and BLM 1981) for the entire Sunnyside STSA was used to evaluate potential impacts and would be used by the applicants and authorizing agencies to determine erosion control, reclamation, and revegetation measures.

The area of influence includes a wide variety and complex combinations of soils due to variations in parent material (geologic) and climatic, topographic, and vegetation features. The soil map units from the third-order soil survey were combined into the following generalized groups to describe the soils within the area of influence, to evaluate potential impacts, and to determine effective erosion control measures, reclamation, and revegetation potential of the area.

SOILS OF THE FLOODPLAINS AND TERRACES (A)

This group consists of deep, well-drained to moderately well-drained, mildly alkaline to slightly acid, loamy, and sandy soils with 5 to 60 percent of rock fragments and areas with bouldery surfaces. These soils are on gently sloping to moderately sloping (1 to 8 percent) floodplains within the narrow, elongated, intermittent and perennial drainages, including the smoother sloping toeslopes of the adjoining mountain sideslopes. These soils are formed in a mixed alluvium derived mainly from sedimentary rock (sandstone and shale). They are subject to a slight to moderate water erosion hazard, flooding,

TABLE A-7-1
EROSION CONTROL, RECLAMATION, AND REVEGETATION PROGRAM CHECKLIST[a]

RECLAMATION METHODS AND PROCEDURES[b]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[c] Amoco	Chevron-GNC	Enercor	Mono	Sabine
GENERAL MEASURES					
A. Avoidance of Critical Areas by Preplanning Construction Alignment (where possible).	O	O	O	O	O
B. Construction Timing to Minimize Impacts (e.g., cropland areas).	NA	NA	NA	NA	NA
C. Construction Precautions During Adverse Weather Conditions (e.g., prevent tracking and compaction during wet soil conditions).	X	O	X	X	O
D. Minimize Off-road Vehicle Travel to Reduce Land Surface Disturbance.	X	O	X	X	O*
E. Preparation and Implementation of an Erosion Control, Reclamation, and Revegetation Plan Tailored to Conditions, Within Project Area.	X	O	X	X	O
F. Reclamation Accomplished in all Disturbed Areas as soon as Practical.	O	X	X	X	X
*G. Compliance with Regulations (local, state, and federal) and Implementation of Applicable Measures and Procedures.	X	X	X	X	X
LAND SURFACE AREA DISTURBANCE, EROSION CONTROL, AND RECLAMATION					
A. Right-of-Way and Site Clearing and Preparation					
1. Minimize area disturbance	X	X	X	X	X
2. Vegetation and growth cover clearing, storage, or disposal	X	X	X	X	X
3. Protection of existing vegetation	X	X	X	X	X
4. Protection of natural drainage	X	O	X	X	O
5. Land grading technique-steep slopes	O	O	O	X	O
6. Techniques used at stream crossings and streams	X	O	X	X	O
7. Erosion control (wind and water) measures	X	X	X	X	X
8. Sedimentation (retention) basins, dikes, and diversions	X	X	X	X	X
9. Design, construction, and restoration of temporary roads and construction sites	O	O	O	X	O
B. Site Grading, Trenching, and Preservation of Topsoil and Excavated Material Handling					
1. Topsoil (or suitable plant growth material) removal, storage, and protection	X	X	X	X	X
2. Excavated material stockpiling procedures	X	O	O	X	O
3. Trenching techniques (steep sloping areas)	X	O	O	X	O
4. Grading techniques for surface facilities	O	O	O	X	O
5. Fill areas (compaction and erosion control)	O	O	O	X	O
C. Backfilling, Shaping, and Cleanup					
1. Backfilling procedures (compaction)	X	X	X	X	X
2. Topsoil replacement	X	X	X	X	X
3. Restoring contour of land surface to permit drainage	X	O	X	X	O
4. Restoring soil physical conditions (subsoiling, etc.)	X	O	X	X	O
5. Restoring structures (roads, irrigation systems, etc.)	O	O	O	X	0
6. Match surrounding landscape (rock outcroppings, coarse fragments on surface, etc.)	X	O	X	X	O
7. Erosion control measures (contouring, terraces, diversions)	X	X	X	X	X
8. Excess or unsuitable excavated material disposal	O	O	O	O	O
D. Land Preparation for Seeding and Cultivation					
1. Measures to improve soil physical conditions	X	O	X	X	O
2. Seed bed preparation	X	O	X	X	O
3. Surface roughness condition	X	O	O	X	O
4. Fertilizers and other soil admendments (if applicable)	X	O	O	X	O
5. Suitable mulches and mulching practices	X	O	X	X	X
6. Land preparation methods on "critical areas"	O	O	O	O	O

TABLE A-7-1 (Continued)
EROSION CONTROL, RECLAMATION, AND REVEGETATION PROGRAM CHECKLIST[a]

RECLAMATION METHODS AND PROCEDURES[b]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[c] Amoco	Chevron-GNC	Enercor	Mono	Sabine
E. Revegetation (Reseeding and Planting)					
1. Selection of adapted species	X	X	X	X	X
2. Seeding and planting methods and techniques	X	O	O	X	O
3. Supplemental irrigation (when applicable)	NA	NA	NA	NA	NA
4. Protection of seedlings	X	O	O	X	O
5. Continuing revegetation efforts to ensure satisfactory cover (when necessary)	O	O	O	X	O
F. Maintenance and Monitoring					
1. Identify maintenance, monitoring, and corrective measures to ensure erosion control and successful revegetation	O	O	X	X	O
G. Use of Biochemicals					
1. Identify procedures regarding use of herbicides, pesticides, and fertilizers (when needed)	O	O	O	X	O
PROCESSED TAR SAND DISPOSAL AREA RECLAMATION					
A. Topsoil and Suitable Plant Growth Material Removal and Storage	X	X	X	X	NA
B. Design of Disposal Area (geomorphic relationships, blending with surrounding terrain)	X	O	O	X	NA
C. Ground Water Contamination Control	O	O	O	O	NA
D. Suitable Surface Water Runoff Control Structures, and Retention Ponds (surface water contamination control)	X	O	X	X	NA
E. Placement and Compaction of Spent Sand	O	O	O	O	NA
F. Shaping and Contouring Disposal Embankments	X	O	X	X	NA
G. Leaching Soluble Salts from Root Zone	O	O	O	O	NA
H. Topsoil or Suitable Plant Growth Material Replacement (blending color of disposal pile with surrounding area)	X	O	X	X	NA
I. Application of Organic Matter, Fertilizers, and Soil Admendments	X	O	X	X	NA
J. Erosion Control Measures (contouring, diversions, benching, etc.)	X	X	X	X	NA
K. Seeded Preparation	X	X	X	X	NA
L. Suitable Mulches and Mulching Practices	X	X	X	X	NA
M. Selection of Adapted Species for Revegetation	X	O	X	X	NA
N. Applicable Seeding and Planting Methods	X	O	X	X	NA
O. Transplanting Native Shrubs and Trees to Blend Visually with Surrounding Area (if applicable)	NA	NA	NA	NA	NA
P. Supplemental Irrigation (if applicable)	O	O	O	O	NA
Q. Protection of New Seedlings and Plantings from Livestock and Wildlife	X	O	X	X	NA
R. Continuing Revegetation Efforts (where necessary)	X	O	O	X	NA
S. Maintenance, Monitoring, and Corrective Measures	X	O	O	X	NA
T. Use of Surface Water Runoff for Revegetation and Other Project Use	O	O	O	X	NA
SURFACE MINING AND IN-SITU MINING RECLAMATION					
A. Surface Mining Sequence and Design (compatible with terrain and overburden)	X	X	X	X	X
B. Overburden Analysis (physical and chemical)	O	O	O	O	NA
C. Topsoil and/or Suitable Plant Growth Material Removal and Storage	X	X	X	X	X
D. Materials Handling (soils and overburden)	X	O	X	X	NA
E. Ground Water Contamination Control Measures	O	O	O	O	O

TABLE A-7-1 (Concluded)
EROSION CONTROL, RECLAMATION, AND REVEGETATION PROGRAM CHECKLIST[a]

RECLAMATION METHODS AND PROCEDURES[b]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[c] Amoco	Chevron-GNC	Enercor	Mono	Sabine
F. Suitable Surface Water Runoff Control Structures and Retention Ponds (surface water contamination control)	X	X	X	X	X
G. Covering Undesirable Spoil Material	O	O	O	X	NA
H. Placement and Compaction of Spoil Material	X	O	X	X	NA
I. Grading, Shaping, and Restoration of Natural Surface Drainages	X	O	O	X	O
J. Topsoil and/or Suitable Plant Growth Material Replacement on Mine Overburden	X	O	X	X	NA
K. Erosion Control Measures (contouring, diversion, benching, etc.)	X	X	X	X	X
L. Application of Organic Matter, Soil Admendments and Fertilizers.	O	O	O	X	O
M. Maintaining Soil Physical Conditions (subsoiling, etc.)	O	O	O	X	O
N. Seed Bed Preparation	X	X	X	X	O
O. Suitable Mulches and Mulching Practices	X	O	X	X	O
P. Selection of Adapted Species for Revegetation	X	X	X	X	X
Q. Applicable Seeding and Planting Methods	X	O	X	X	O
R. Transplanting Native Shrubs (Nursery Stock) to Blend Visually with Surrounding Areas (if applicable)	NA	NA	NA	NA	NA
S. Supplemental Irrigation (if applicable)	NA	NA	NA	NA	NA
T. Protection of New Seedlings and Plantings from Livestock and Wildlife	O	O	O	X	O
U. Maintenance, Monitoring, and Corrective Measures (including revegetation efforts, where necessary)	X	X	X	X	O
V. Use of Surface Water Runoff for Revegetation	O	O	O	O	O

[a]This checklist was developed by the Bureau of Land Management, Division of EIS Services to provide a guideline to review and evaluate the adequacy and effectiveness of the applicants' proposed erosion control, reclamation, and revegetation programs. The checklist consists of a summarized list of measures, practices, and procedures essential to ensure successful reclamation, revegetation, and erosion control for land disturbance.

[b]The measures and procedures listed have been used in meeting objectives associated with soil and water conservation, water management, pollution abatement, waste disposal, improved fish and wildlife habitat and improved quality of the environment. The effectiveness and reliability of these measures and procedures are based on research, field trials, and experiences of many years. Specific measures associated with surface mining activities and processed sand disposal areas are based on recent research and field trials. All practices and procedures identified are well-documented and have been demonstrated to be reliable in making assumptions regarding effectiveness when properly implemented. (List of references (30) available upon request from Bureau of Land Management, EISS, 555 Zang Street, First Floor East, Denver, Colorado 80228.)

[c]Review comments should reflect the adequacy of the applicant's proposed program by: (1) identifying the essential measures and procedures recognized; (2) identifying essential measures omitted; (3) making note of overall intent and compliance to ensure successful reclamation, revegetation, and erosion control; and (4) establishing whether program is tailored to the needs and conditions (soils, vegetation, and climate) of the project area. Additional mitigation measures needed by applicant should also be identified.

X =Measure(s) contained in applicant's proposed program.
O = Measure(s) not contained in applicant's proposed program.
NA = Measure(s) determined to be not applicable or not essential.

and stream cutting. These soils are some of the most productive in the area and are used for grazing and wildlife. Because of the smoother slopes, the soils are also used for transportation corridors, especially in the mountain areas. These soils occur in areas with an average annual precipitation ranging from 12 to 20 inches and are most dominant in areas with a 60- to 120-day growing season.

Because of the physiographic position of this soil group (it receives runoff from the surrounding sloping areas), no subgroup for precipitation was made. Some areas of this soil group can be mapped at a 1:24,000 scale, but many of the narrow, elongated areas next to streams are too small to separate. Even though these areas are not delineated on maps, this soil group must be recognized because of its importance to watershed conveyance.

SOILS OF THE SLOPING TO STRONGLY SLOPING ALLUVIAL FANS AND HIGH TERRACES OF THE PLAINS (F)

This group consists of mainly deep, well-drained, loamy and sandy soils on gently sloping to strongly sloping (3 to 15 percent) alluvial fans, terraces, and benches in the outwash plains. These soils are forming in mixed materials weathered from sedimentary and metamorphic rocks with varying amounts of rock fragments (15 to 65 percent) ranging in size from gravel to stone, including some boulders, on the surface and scattered throughout the profile. These soils are subject to a moderate water erosion hazard. They are used for livestock grazing and wildlife habitat. They occur in areas with an average annual precipitation of 12 to 16 inches and a 60- to 120-day growing season. This group of soils is located in the plains area southwest of the mountain ridges near Sunnyside, Columbia, East Carbon, and Dragerton. Project components in these soil areas would include processing plants, mill sites, and spent sand disposal areas.

SOILS OF THE SLOPING TO STRONGLY SLOPING MESAS, MOUNTAIN RIDGE TOPS, PLATEAUS, AND STRONGLY SLOPING TO MODERATELY STEEP MOUNTAIN SIDE SLOPES (M)

This group consists of shallow and moderately deep to deep, well-drained, slightly alkaline to moderately acid, sandy and loamy soils on sloping to strongly sloping (3 to 15 percent) mesas, convex mountain ridgetops, plateaus, and strongly sloping to moderately steep (9 to 25 percent) mountain sideslopes. These soils are forming in mixed alluvial, colluvial, and residual materials derived mainly from sedimentary rock (sandstone and shale). They contain varying amounts of rock fragments (10 to 65 percent), ranging in size from gravel to stone. These soils are subject to a slight to moderate water erosion hazard. This soil group occurs in all climatic zones and are used mainly for livestock grazing and wildlife habitat. These soils most commonly have moderately high forage production, especially in the 16- to 20- and 20-to 30-inch annual precipitation zones.

This soil group is located in three climatic zones:

M-1: 12- to 16-inch average annual precipitation with a 60-to 120-day growing season.

M-2: 16- to 20-inch average annual precipitation with a 60- to 120-day average growing season.

M-3: 20- to 30-inch average annual precipitation with less than a 60-day growing season.

SOILS OF THE STEEP AND VERY STEEP MOUNTAIN SIDESLOPES, CANYON WALLS, AND MESA ESCARPMENTS (MS)

This group consists of dominantly rocky, very shallow, shallow and moderately deep, well-drained, slightly alkaline to moderately acid, sandy-skeletal, and loamy-skeletal soils on steep, very steep, and extremely steep (30 to 75+ percent) mountain sideslopes, canyon walls, and mesa escarpments. Common inclusions are areas with rock outcrop and small areas with deep soils in concave and toe slope areas. These soils are forming in mixed alluvial, colluvial, and residual materials derived from sedimentary rock (sandstone and shale) with varying amounts of rock fragments (35 to 60 percent) range in size from gravel to stone. Surfaces range from stony to extremely bouldery. These soils are most commonly sparsely vegetated, occurring on south-facing slopes in the lower precipitation zone. They are subject to high runoff and a high erosion hazard. North-facing slopes are commonly vegetated with mixed conifers, aspen, and mountain shrubs and are also subject to a high water erosion hazard. These soils are used mainly for wildlife habitat, watershed, and limited livestock grazing. Use of woodland is limited due to accessability, steep terrain, and low timber value.

This group is located in three climatic zones:

MS1: 12- to 16-inch average annual precipitation with a 60- to 120-day growing season.

MS2: 16- to 20-inch average annual precipitation with a 60- to 120-day growing season.

MS3: 20- to 30-inch average annual precipitation with less than a 60-day growing season.

RECLAMATION AND EROSION CONTROL ANALYSIS

The reclamation and erosion control procedures (Assumptions section of Appendix A-7 and Table A-7-1) were developed and evaluated using information collected in the soils and vegetation review of the projects.

Soils, vegetation, and climatic information was collected for the surface areas that would potentially be disturbed. The soil survey of the Range Creek portion of the Carbon area, Carbon County, Utah (SCS and BLM 1980) was used to identify soil types and terrain strongly affecting construction and surface mining procedures, and revegetation and restoration potential. The soils data was analyzed and evaluated to identify the following:

- areas with soil properties that strongly affect restoration and revegetation of native rangeland;
- the reconstruction potential of the affected soil types;
- areas that are susceptible to high wind and water erosion hazards;
- effective measures to lessen the effects of soil disturbances caused by construction, surface mining, on-site mining, and spent sand disposal, and to control accelerated erosion; and
- areas where erosion and resultant sediment yield would affect water quality.

Soil erosion losses were estimated by the use of the universal soil loss equation (USLE) and the wind erosion equation as applied to construction sites for selected soil areas representing various conditions occurring throughout the area of influence.

Recent developments in the USLE make it a valuable tool for selecting and evaluating conservation practices on disturbed areas resulting from construction. The information gained by applying the USLE to selected soil sites was used as a basis for determining appropriate erosion control and revegetation measures and to evaluate the effectiveness of those measures for ensuring successful erosion control, revegetation, and restoration.

Selected soils identified in Table A-7-2 represent significant conditions expected to occur within the area of influence The table also identifies the effectiveness of several erosion control measures or combinations that could be used to control soil erosion.

More information, consisting of major rangeland management concerns and recommended conservation practices, was obtained from the Price River Grazing Management Draft EIS (BLM 1982a) and the Soil Survey of the Carbon-Emery Area, Utah (SCS and BLM 1980).

A detailed site-specific construction and erosion control plan would be developed, including locally recommended techniques and measures tailored to the conditions found. Proper implementation of the erosion control and revegetation measures outlined in the guidelines would assure successful land restoration.

The outlined maintenance and monitoring program would identify problem areas (those with adverse weather conditions during restoration periods) or small localized areas with adverse soil properties and provide corrective measures to ensure erosion control.

SURFACE MINING AND LAND RESTORATION SCENARIOS AND SPENT TAR SAND DISPOSAL AREA RECLAMATION

Because of the predominantly steep and very steep terrain and overburden depth, special surface mining, land restoration, and reclamation procedures and measures would be needed to ensure successful ore extraction and reclamation of the surface mined areas.

Table A-7-2 Table A-7-2 (cont'd.)

Two types of surface mining reclamation scenarios were identified by the applicants in their proposed plans of operations:

(1) Land disturbed by surface mining would be reclaimed in stages concurrently with mining progress. Only a part of the mining area would be disturbed and remain unreclaimed at any one time. After a workable pit opening (80 to 320 acres) is excavated, overburden would be replaced, regraded, and seeded within the mined area, and plants would be allowed to reestablish.

(2) Surface mining would continue for 20 years before reclamation procedures would begin. This scenario is proposed by Amoco. The unreclaimed area would involve 3,000 acres, causing a larger area to be subject to accelerated erosion and remain vegetatively unproductive.

Because of the major topographic changes caused by surface mining and the predicted unfavorable plant growth properties and erosive nature of the spent tar sand, the following special land restoration, reclamation, and erosion control measures would be needed to ensure successful reclamation. (See to Table A-7-2 for scenario erosion control analysis.)

- The restored land surface slope would not exceed 35 percent, except for areas where headwalls could be maintained. The dominant slope would range from 5 to 30 percent.

- The restored land surfaces, temporary topsoil and overburden storage piles, and the spent sand disposal piles would be benched or contain diversionary structures at slope intervals not exceeding 100 feet to reduce runoff velocities and concentrations.

- Adequate amounts of the most favorable plant growth materials would be replaced on the regraded land surface to provide for establishment of vegetation cover.

- Land surfaces of restored areas and soil and overburden areas would be protected by crop residues and rock fragment mulches in combination with contour soil surface manipulations and riprapped diversion structure outlets.

- Retention dams and sediment ponds would be used to control sediment. These ponds would be small with steep banks so that water depths would not be conducive to vector (mosquito) reproduction. Constant recycling of the water would also discourage vector production; therefore, problems with vector populations are not expected.

- Landform restoration would include grading and land surface shaping to blend with the surrounding surface mined and unmined topography, to minimize the disequilibrium landscape effect, to provide for maintenance of an effec-

tive surface drainage system commensurate with the topography and annual precipitation, and to provide stable slopes (American Society of Agronomy, Crop Science Society of America, Soil Science Society of America 1978).

- Applicable conservation measures would be used as outlined in the Erosion Control, Reclamation, and Revegetation Guidelines.

SOIL RECONSTRUCTION POTENTIAL

The soils within the area of influence are dominantly classified as Land Capability Unit VII with smaller areas classified as Land Capability Class VI. This Land Classification System (SCS 1961) groups soils into special units according to their capability for intensive use and treatment required for sustained use. Soils in Class VI have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture, range, woodland, or wildlife food and cover. Sites in Class VII have very severe limitations that make them unsuitable for cultivation and restrict their use largely to grazing, woodland, wildlife or water supply, and aesthetic purposes.

Approximately 78 percent of the soils within the potential mine area are dominantly shallow to moderately deep (10 to 40 inches) to bedrock, contain varying amounts of rock fragments (15 to 50 percent by volume), and occur on steep and very steep terrain. Detailed information concerning soil types and extent can be reviewed at the BLM, Division of EIS Services.

The surface mining process would completely alter the original soil profile characteristics. Soils would be reconstructed during the land restoration and reshaping process. Concerns related to soil reconstruction in the area include availability of favorable plant growth material and the varying amounts and sizes of rock fragments.

The reconstructed soils on the reclaimed area would have properties that depend upon the amount of favorable plant growth material from the soil types affected and the process of effectively using those materials in the reshaping and regrading process. Reconstruction soils are expected to consist of deep, unconsolidated, overburden material mantled with a surface layer of original surface soil and favorable plant growth material averaging 12 or more inches thick. Even though this reconstructed soil would have no structure, the texture and rock fragments would allow for favorable water infiltration, permeability, and water holding capacity. (Soil-water relationships are expected to be enhanced over the preconstruction condition.) The soil organic matter and nutrient levels could be most strongly affected by the soil reconstruction process. Additions of organic matter in the form of crop residues, manure, and wood fiber would improve the soil organic matter level. Applying commercial fertilizers containing nitrogen and phosphorous is effective in maintaining soil fertility, especially in areas receiving higher amounts of normal precipitation. (See Map 3-2, map pocket in the draft EIS for climatic zones.)

One of the major concerns in soil reconstruction is the effect of contamination from toxic materials or unfavorable plant growth materials, which would affect soil reclamation potential. On-site testing and reclamation expertise are essential in minimizing this concern.

The reclamation potential of the reconstructed soil and landscape is expected to be generally suitable if overburden and favorable plant growth materials in the soil reconstruction and land reclamation process are effectively used. Some localized, steep areas (about 5 to 8 percent of the area), resembling talus-like slopes could remain in the reclaimed landscape. These areas would equate to the preconstruction occurrence of rock outcrop areas in extent and productivity.

REVEGETATION POTENTIAL

The seven vegetation types within the area of influence are a composite of several plant communities that occur within the particular climatic and physiographic settings. They are composed of three kinds of vegetation; trees, brush and shrubs, and grasses and forbs. The time required for restoration of vegetation strata to pre-existing levels would vary greatly among the kinds of vegetation. Estimated time requirements and impacts are discussed in Section 3.A.3, Soils and Vegetation.

SUMMARY

Successful erosion control, land restoration, reclamation, and revegetation are generally expected to be achieved throughout the project areas if the applicants implement effective measures and procedures tailored to the kinds of land disturbance and to the conditions found. To ensure reclamation success, however, a strong compliance program accompanied by an effective monitoring and maintenance program is needed to ensure that measures are applied in a timely and effective manner and that follow-up measures are carried out. The compliance program would be conducted by the authorizing agencies and landowners for their lands. Impacts to soils and their potential to reproduce vegetation to preconstruction levels, however, would be significant if erosion control, soil reconstruction, and reclamation measures are not implemented because of noncompliance with approved plans if adverse weather conditions (mainly heavy rainstorms) occur during construction before any erosion control measures can be carried out.

TABLE A-7-2
WATER EROSION RATES ASSOCIATED WITH SEVERAL SOIL EROSION TREATMENT AND REVEGETATION SCENARIOS

Soil, Setting, and Vegetative Cover and Restoration Scenario	Condition, Erosion Treatment, and Revegetation Scenario	Erosion Rates (Tons/Acre/Year)[a]
Midfork Soil—Deep, bouldery, loamy soil forming on colluvial materials derived from sandstone and shale. Annual precipitation of 20 to 30 inches. Slope - 60 percent, 600 feet long. Vegetative cover - aspen, mixed conifer and mountain shrub, 50 percent canopy. (Part of map unit HUG - Midfork - Eldwood complex, 50 to 70 percent slope.)	Current Condition	3.8
Reconstructed soil and topography - slope 30 percent, length 200 feet. Deep (40 inches plus), loamy soil with 18-inch surface soil mantel.[c] (Surface mine area restored.)	Erosion control measures:	
	- exposed soil[b]	72.0
	- 100' water bars	48.0
	- 1 ton mulch	13.0
	- 2 ton mulch	4.3
	- 100' water bars plus 1 ton mulch	8.5
	Reseeding (with 100-foot water bar or terraces)	
	- 2nd year 25 percent understory cover	6.2
	- 5th year 50 percent understory cover	1.9
Beenom Soil—Shallow, loamy soil underlain by sandstone at 6 to 20 inches. Annual precipittion - 16- to 20-inches. Slope - 10 percent, 200 feet long. Vegetative cover - Wyoming Big Sage, grass (canopy 25 percent brush and 40 percent understory). (Part of map unit ODD - Beedom loam, 3 to 15 percent slope.)	Current Condition	0.9
Reconstructed soil and topography - slope 12 percent, length 300 feet. Moderately deep to deep loamy soil with 18-inch surface soil mantel.[c] (Surface mine area restored.)	Erosion Control Measures:	
	- Exposed soil[b]	18.0
	- 100' water bars	9.0
	- 1 ton mulch	3.2
	- 2 ton mulch	1.1
	- 100' water bars plus 1 ton mulch	0.5
	Reseeding (with 100-foot water bars and terraces)	
	- 2nd year 20 percent understory cover	1.6
	- 5th year 40 percent understory cover	0.8
Benteen Soil—Moderately deep (20 to 40 inches) loamy soil underlain by sandstone and shale. Annual precipittion - 20 to 30 inches. Slope - 30 percent, 500 feet long. Vegetative cover - aspen, mixed conifer (canopy 50 percent). (Part of map unit OPF - Benteen - Decross ______ complex 15 to 40 percent slopes.)	Current Condition	2.2
Reconstructed soil and topography - Slope - 20 percent, 200 feet long. Moderately deep and deep loamy soil with 18-inch surface soil mantel.[c] (Surface mine area restored.)	Erosion Control Measures:	
	- Exposed soil[b]	50.4
	- 100' water bars	33.6
	- 1 ton mulch	9.1
	- 2 ton mulch	3.0
	- 100' water bars plus 1 ton mulch	2.0
	Reseeding (with 100-foot water bars or terraces)	
	- 2nd year 25 percent understory cover	1.3
	- 5th year 50 percent understory cover	0.4
Ildefonso Soil—Deep, very stony loamy soils forming in mixed alluvial materials on fans. Annual precipitation - 12 inches. Slope - 16 percent, 1,200 feet long. Vegetative cover - pinyon-juniper and salina wild rye. (Part of map unit IEC - Ildefonso very stony loam, 3 to 8 percent slope.)	Current Condition	5.6

TABLE A-7-2 (Concluded)
WATER EROSION RATES ASSOCIATED WITH SEVERAL SOIL EROSION TREATMENT AND REVEGETATION SCENARIOS

Soil, Setting, and Vegetative Cover and Restoration Scenario	**Condition, Erosion Treatment, and Revegetation Scenario**	**Erosion Rates (Tons/Acre/Year)[a]**
Spent Sand Disposal Area Reclamation - Reconstruction soil and topography - benched side slope - 30 percent slope, 100 foot long.	Erosion Control Measures:	
	- Exposed soil[b]	44.8
	- 1 ton mulch	8.1
	- 2 ton mulch	2.7
	Reseeding:	
	- 2nd year 10 percent cover (grass)	20.2
	- 5th year 20 percent cover (grass)	8.9
	- 2nd year 10 percent cover (grass) residual mulch plus contour surface manipulation (contour furrows)	13.1
	- 5th year 20 percent cover (grass) contour surface manipulation (contour furrows)	5.8
	- 2nd year 10 percent cover (grass) residual mulch plus contour surface manipulation (contour forrow) plus 50'	9.0
	- 5th year 20 percent cover (grass) contour surface manipulation (contour furrows) plus 50' interval water bar or slope length reduction	4.0

Note: Soil and vegetation condition selection based on soil survey data from the soil survey of Range Creek portion of Carbon area, Carbon County, Utah.

[a]Based on Universal Soil Loss Equation (USLE) calculations using factors outlined in "Preliminary Guidance for Estimating Erosion on Areas Disturbed by Surface Mining Activities in the Interior Western United States."

[b]Represents a bare, loose soil condition occurring during construction and immediately following regrading. Soil loss estimates are speculative for scopes exceeding 24 percent, as these values are beyond the range of research data. Soil losses are identified as "worst-case" and would require extremely adverse weather and construction conditions.

[c]Surface soil mantel consists of the most favorable plant growth materials spread on the surface of reconstructed soil with surface roughness manipulation on the contour.

APPENDIX A-8
ENDANGERED SPECIES ACT COMPLIANCE

The Endangered Species Act of 1973 requires, under Section 7, that any federal agency carrying out any action that might affect an endangered species must consult with the Fish and Wildlife Service concerning the effects of the project on threatened or endangered species.

The Correspondence contained in this appendix is the Fish and Wildlife Service response to BLM's request for the Section 7 listing of threatened or endangered species and the official FWS biological opinion.

RECEIVED

JUN 3 1983

EIS OFFICE

31 May 1983

TO: District Manager, Bureau of Land Management, Moab, Utah

FROM: Field Supervisor, Endangered Species Office, U. S. Fish and Wildlife Service, Salt Lake City, Utah

SUBJECT: Species list for Sunnyside Tar Sand Project

We have reviewed your memo of 29 April 1983 concerning a request for a species list for the Sunnyside Special Tar Sand Area. It appears that listed endangered and threatened species, or species proposed for listing, may occur in the area of influence of this action.

To comply with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies or their designees are required to obtain from the Fish and Wildlife Service (FWS) information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed construction project. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

<u>Listed Species</u>

bald eagle	<u>Haliaeetus leucocephalus</u>
black-footed ferret	<u>Mustela nigripes</u>
Colorado squawfish	<u>Ptychocheilus lucius</u>
Uinta Basin hookless cactus	<u>Sclerocactus glaucus</u>

<u>Candidate Species</u>

razorback sucker	<u>Xyrauchen texanus</u>
Canyon Sweet vetch	<u>Hedysarum occidentale</u> var. <u>canoe</u>

Section 7(c) also requires the Federal agency proposing a major Federal action significantly affecting the quality of the human environment to conduct and submit to the FWS a biological assessment to determine the effects of the proposal on listed and proposed species. The biological assessment shall be completed within 180 days after the date on which initiated or a time mutually agreed upon between the agency and the FWS. Before physical modification/alternation of a major Federal action is begun the assessment must be completed.

If the biological assessment is not begun within 90 days, you should verify this list with us prior to initiation of your assessment. We do not feel that we can adequately assess the effects of the proposed action on listed and proposed species or critical habitat and proposed critical habitat without a complete assessment. When conducting a biological assessment, you shall, at a minimum:

1. conduct a scientifically sound on-site inspection of the area affected by the action, which must, unless otherwise directed by the FWS, include a detailed survey of the area to determine if listed or proposed species are present or occur seasonally and whether suitable habitat exists within the area for either expanding the existing population or potential reintroduction of populations;

2. interview recognized experts on the species at issue, including those within the Fish and Wildlife Service, state conservation agencies, universities, and others who may have data not yet found in scientific literature;

3. review literature and other scientific data to determine the species' distribution, habitat needs, and other biological requirements;

4. review and analyze the effects of the action on the species, in terms of individuals and populations, including consideration of the cumulative effects of the action on the species and habitat;

5. Listed fishes may be impacted as a result of water withdrawals from the Green River system. To evaluate possible impacts to listed fishes the following information is needed: net depletion figure (acre-feet), intake volumes and reservoir storage, evaporative losses from reservoirs and reservoir volumes, location timeing, and water quality characteristics of any return flows.

6. analyze alternative actions that may provide conservation measures;

7. conduct any studies necessary to fulfill the requirements of (1) through (5) above;

8. review any other relevant information.

The FWS can enter into formal Section 7 consultation only with another Federal agency or its designee. State, county, or any other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participante in meetings, etc.

After your agency has completed and reviewed the assessment, it is your responsibility to determine if the proposed action "may affect" any of the listed species or critical habitats. You should also determine if the action is likely to jeopardize the continued existence of proposed species or result in the destruction or an adverse modification of any critical habitat proposed for such species. If the determination is "may affect" for listed species you

must request in writing formal consultation from the Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service at the address given above. In addition, if you determine that the proposed action is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, you must confer with the FWS. At this time you should provide this office a copy of the biological assessment and any other relevant information that assisted you in reaching your conclusion.

Your attention is also directed to Section 7(d) of the Endangered Species Act, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

We are prepared to assist you whenever you have questions which we may be able to answer. If we can be of further assistance, please advise us.

The FWS representative who will provide you with technical assistance is Terry J. Hickman of our Salt Lake City Office ([801] 524-4430; FTS 588-4430).

cc: Official file
Reading file
AFA/SE:WWathen
ES/SLC
Robert Pizel, Project Leader √
Bureau of Land Mangement
555 Zang Street
Denver, Colorado 80228

TJH/jg:5-25-83

13 June 1983

MEMORANDUM

TO: District Manager, Bureau of Land Management, Moab, Utah

FROM: Field Supervisor, Endangered Species Office, U. S. Fish and Wildlife Service, Salt Lake City, Utah

SUBJECT: Addition to species list for Sunnyside Tar Sand Project

On 31 May 1983 we sent you a list of endangered, threatened and candidate species that may be impacted by the Sunnyside Tar Sand Project. After reviewing additional information we would like to add the following candidate species to that list:

long-billed curlew	Numenius americanus
ferruginous hawk	Buteo regalis
spotted bat	Euderma maculatum
sedge fescue	Festuca dasyclada

Thank you for your cooperation in conserving endangered species. If you have any questions concerning the above additions please contact us.

Fred L. Bolwahnn

cc: Official file
Reading file

TJH/jg:6-13-83

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES OFFICE
1406 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138-1197

IN REPLY REFER TO:

SE/SLC:6-5-84-0009

February 9, 1984

MEMORANDUM

TO: District Manager, Moab District, Bureau of Land Management
Moab, Utah

FROM: Field Supervisor, Endangered Species Office
U. S. Fish and Wildilfe Service, Salt Lake City, Utah

SUBJECT: Biological Opinion - Sunnyside Tar Sand Lease Conversion Project

We prepared this biological opinion in response to your November 28, 1983 memorandum requesting Section 7 consultation for the Sunnyside Tar Sand Lease Conversion Project located in northeastern Carbon and southern Duchesne counties, Utah. This opinion has been prepared as prescribed in the Section 7 Interagency Cooperation Regulations, 50 CFR 402, and the Endangered Species Act (ESA), 16 U.S.C. 1531 et. seq.

BIOLOGICAL OPINION

The conversion of existing oil and gas leases within the Sunnyside Special Tar Sand Area (STSA) to combined hydrocarbon leases will not jeopardize the continued existence of the Colorado squawfish (Ptychocheilus lucius), bald eagle (Haliaeetus leucocephalus), black-footed ferret (Mustela nigripes), and Uinta Basin hookless cactus (Sclerocactus glaucus), provided that the recommendations listed in this opinion are met.

PROJECT DESCRIPTION

Proponents of 5 tar sand projects have filed applications with the U. S. Bureau of Land Management (BLM) requesting conversion of existing oil and gas leases located within the 157,445 acre area of the Sunnyside STSA to combined hydrocarbon leases under the Combined Hydrocarbon Leasing Act of 1981. The applicants for these 5 tar sand projects are: Amoco Production Company, Chevron USA Inc. - GNC Energy Corporation, Enercor, Mono Power Company, and Sabine Production Company. Conversion approval by the BLM would permit the applicants to develop tar sand resources within the Sunnyside STSA.

The anticipated impacts of the proposed projects would be caused by surface mining and in-situ development of the conversion tracts and by the associated tar sand processing plants. An estimated 36,145 acre-feet per year of Green River water would be required to process the tar sand.

PROJECT IMPACTS TO LISTED SPECIES

We do not believe that the process of converting existing oil and gas leases to combined hydrocarbon leases will jeopardize the continued existence of any listed species. We have determined that this process does not result in an irreversible or irretrievable commitment of resources or funds provided that the Fish and Wildlife Service (FWS) has the opportunity to evaluate and issue separate biological opinions on a project-by-project basis as each plan of operation is submitted to the BLM for review and approval. The FWS evaluation will include the cummulate effects of each project.

RECOMMENDATIONS

As noted in the Sunnyside Tar Sand Environmental Assessment, current project descriptions do not contain sufficient information to make a determination as to whether specific project actions will jeopardize the continued existence of any listed species. Therefore, the FWS recommends that the BLM request reinitiation of Section 7 consultation with the FWS on a project-by-project basis as each plan of operation is submitted to the BLM for review and approval.

We also recommend that the following provision be placed in each lease granted by the BLM for the conversion of oil and gas leases to combined hydrocarbon leases:

> "The lessee shall develop a plan of operation which will fully protect listed or proposed threatened or endangered species and shall submit the plan to BLM for formal consultation with FWS as required by Section 7 of the Endangered Species Act. The plan must cover species occurring on site as well as those off-site species which may be directly or indirectly impacted. Consultation must be completed prior to the irreversible or irretrievable committment of resource or funds for on-the-ground development.
>
> "This lease is issued and accepted with the express agreement that such consultation may require adjustments to the plan of operation, additions of special conservation measures, or limitations to the project in order to assure compliance with such provisions of the Endangered Species Act as may be applicable as determined by FWS at the time of development."

This biological opinion pertains to lease conversions only. Should there be any changes to the Sunnyside Tar Sand Lease Conversion Project, it may be necessary to reinitiate Section 7 consultation. Thank you for your cooperation in conserving endangered species.

Fred L. Bolwahnn

APPENDIX A-9
VISUAL RESOURCE MANAGEMENT METHODOLOGY

The BLM's Visual Resource Management (VRM) system was used to analyze the landscape that the proposed actions and alternatives would traverse.

To compare the visual impacts of the proposed projects and alternatives, the VRM system was applied to lands managed by the Bureau of Land Management (BLM), as well as other federal, state, local, and private lands.

The following sections describe the VRM system and the BLM contrast rating procedure, as well as how the VRM system was applied to the proposed projects. A further explanation of each process may be found by referring to the sources used as a basis for the discussion.

THE BLM VISUAL RESOURCE MANAGEMENT SYSTEM

The VRM system is an analytical process that identifies, sets, and meets the objectives for maintaining scenic values and visual quality (BLM 1978, 1980d).

The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. Aesthetic judgments considered extremely subjective were found to have identifiable, consistent qualities that can be described and measured. Whatever the terrain and whoever the observer, perception of visual quality in a landscape seems to be based on three common principles:

- Landscape character
- Influence of form, line, color, and texture
- Visual variety

Landscape character is primarily determined by the 4 basic visual elements of form, line, color, and texture. Although all 4 elements are present in every landscape, they exert varying degrees of influence. The stronger the influence exerted by these elements, the more interesting the landscape. The more visual variety in a landscape, the more aesthetically pleasing the landscape. Variety without harmony, however, is unattractive, particularly if alterations (cultural modifications) are made carelessly.

The VRM system (see Figure A-9-1, for flow diagram) involves a 4-step process: (1) determining the scenic quality of a landscape; (2) measuring the visual sensitivity of an area; (3) determining the distance zones; and (4) compiling all the information into management classes for guidance in assessing environmental impacts.

SCENIC QUALITY

Scenic quality is perhaps best described as the overall impression retained after driving through, walking through, or flying over an area of land. In the VRM process, rating scenic quality requires a brief description of the existing scenic values in a landscape.

When inventoried, an area is first divided into subunits that appear homogeneous, generally in terms of landform and vegetation. Each area is then rated by 7 key factors: landform, vegetation, water, color, influence on adjacent scenery, scarcity, and cultural modification. A standardized point system assigns great, some, or little importance to each factor. The values for each category are calculated and, according to total points, 3 scenic quality classes are determined and mapped:

Class A—Areas that combine the most outstanding characteristics of each rating factor.

Class B—Areas that combine some outstanding features and some that are fairly common to the physiographic region.

Class C—Areas where the features are fairly common to the physiographic region.

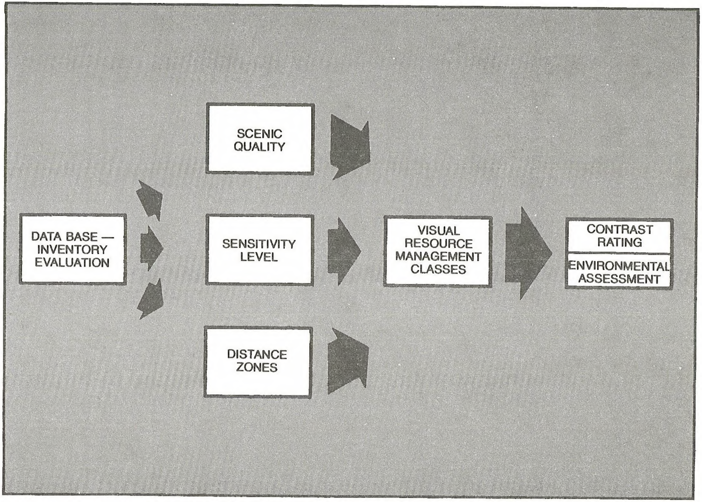

FIGURE A-9-1 THE VISUAL RESOURCE MANAGEMENT SYSTEM PROCESS

SENSITIVITY LEVELS

Although landscapes have common elements that can be measured, there is still a subjective dimension to landscape aesthetics. Each viewer brings perceptions formed by individual influences, culture, visual training, familiarity with local geography, and personal values.

To measure regional and individual attitudes in evaluating a landscape, visual sensitivity is determined in 2 ways:

Use Volume

Frequency of travel through an area (by road, trail, and river) and use of an area (for recreation, camping, and events) are tabulated. The area is then assigned a high, medium, or low rating according to predetermined classifications.

User or Public Reaction

Public groups are familiarized with the area (if necessary) and asked to respond to activities that will modify that landscape. The concern they express about proposed changes in scenic quality is also rated high, medium, or low.

The various combinations of use volume and user reaction for each are converted by a matrix to an overall sensitivity rating of high, medium, or low. A map is then developed that illustrates these sensitivity levels.

DISTANCE ZONES

The visual quality of a landscape (and user reaction) may be magnified or diminished by the visibility of the landscape from major viewing routes and key observation points.

A landscape scene or 'seen area' can be divided into 3 basic distance zones: (1) foreground/middleground; (2) background; and (3) seldom-seen. Because areas that are closer have a greater effect on the observer, such areas require more attention than do areas that are farther away. Distance zones allow consideration of the proximity of the observer to the landscape.

Selection of the key viewing points and accurate assessment of distance zones require some judgment. Where several viewing routes exist, what is foreground from one route may be background from another. In that case, the more restrictive designation is used. Atmospheric conditions may also modify the perception of distance.

The process culminates in a final distance zone map.

MANAGEMENT CLASSES

Management classes describe the different degrees of modification allowed to the basic elements of the landscape. Class designations are derived from an overlay technique that combine the maps of scenic quality, sensitivity levels, and distance zones. The overlays are used to identify areas with similar combinations of factors. These areas are assigned to 1 of 5 management classes according to predetermined criteria. The resulting map of contiguous areas sharing the same VRM class is used to assess the visual impact of proposed development.

The 5 classes are:

Class I

This class provides primarily for natural ecological changes; management activities are to be restricted and are not to attract attention.

Class II

Changes in basic elements by management activities should not be evident in the characteristic landscape.

Class III

Contrasts to the basic elements may be evident and begin to attract attention, but they should remain subordinate to the existing characteristic landscape.

Class IV

Alterations may attract attention but should repeat the form, line, color, and texture characteristics of the landscape.

Class V

Rehabilitation is needed to restore the landscape to the character of the surrounding landscape.

THE BLM VISUAL RESOURCE CONTRAST RATING SYSTEM

The objective of the visual resource contrast rating system is to provide a measure of whether the proposed actions will meet the requirements of the assigned VRM classes (BLM 1978 and 1980). The degree to which a management activity adversely affects the visual quality of a landscape depends on the extent of visual contrasts that is created between the activity and the existing landscape character. Contrast is measured by separating the landscape into land and water surfaces, vegetation, and structures and then predicting the magnitude of contrast with the basic elements (form, line, color, and texture) for each of these major features. Assessing the degree of contrast will indicate the severity of impact and will guide the plans for mitigating the contrasts to meet the requirements of the VRM classes. Contrasts are considered from the most critical viewpoints for distance, angle of observation, length of time, relative size of the project, season of the year, light, and the effects of time on the healing process.

The following parameters have been applied to determine if the proposed actions would meet the requirements of the assigned VRM classes.

Class I: The degree of contrast for any one element may not exceed a weak degree of contrast (1x), and the total contrast rating for any one feature may not exceed 10.

Class II: The degree of contrast for any one element may not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 12.

Class III: The degree of contrast for any one element should not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 16.

Class IV: The total contrast rating for any feature should not exceed 20.

VRM SYSTEM APPLICATION TO THE SUNNYSIDE PROJECT

The following section explains how the VRM system was applied to the Sunnyside project analysis. The explanations are intended to more thoroughly document how the results of the impact analysis were obtained.

Anticipated areas of landscape modification that would result in high visual contrast if the proposed actions (or alternatives) were to be implemented were evaluated for contrasts. The duration of view, numbers of viewers, angle of observation, relationship to other views, mining locations and techniques, ease of revegetation, and proposed restoration methods (Appendix A-7, Reclamation and Erosion Control Programs) were considered in analyzing the degree of contrast. In addition, other development in the area was considered where applicants' projects are proposed in order to understand the overall change that might be expected for the affected area. The contrast evaluation was concerned with the immediate effects of mining, such as changed landform, removed vegetation, and finished structures, as well as the long-term effects of mining and in-situ recovery processes over the life of the projects. All impacts were considered to be long-term (beyond the life of the projects), because of the long period of commercial operations and length of time necessary to lessen the visual contrast with the existing landscape. Short- term impacts (less than the life of the projects), such as the visual presence of work crews, were not considered.

An additional step was taken to identify areas of highly significant adverse impacts, because the western escarpments and mountains of the main block of the Sunnyside Special Tar Sand Area (STSA) are highly visible to travelers on Highways 6, 10, and 123, and to residents of Price, Wellington, and other valley communities. The mountains serve

as a background to foreground and middleground views from the highways and from these communities. The views are not nearly as dramatic as the background itself, which places added quality on the views. As a result, the local views would be highly degraded if the background were to be significantly altered.

Specific considerations were evaluated for the 3 types of impact-related activities that would occur within the area—resource recovery (surface mining and in-situ extraction), construction and operation of processing plants, and development of spent sand disposal areas. Surface mining considerations included how the ongoing mining would affect and relate to the existing landscape and over what length of time, the type of landform that would exist after rehabilitation, and how it would blend with existing conditions. Differences in visual contrast between the mined and reclaimed area and the existing landscape considered the steepness or flatness of the landform, resultant horizontal lines formed by various levels and headwalls, and whether the reformed landscape would blend visually with the existing landscape. Existing and anticipated vegetation used for rehabilitation were considered in judging the visual contrast that would occur following surface mining and in-situ extraction.

The plant sites were assessed from the standpoint of the visual contrasts that could be anticipated between the existing landscape character and the proposed structures. While the plans of operations do not define exactly how the sites would appear, it was concluded the primary contrast would be between the structure and its siting conditions, rather than a contrast in landform or vegetative modifications.

The spent sand disposal areas were assessed for potential visual contrasts that would occur as a result of modifying, or in most cases, imposing a new and contrasting landform upon the existing landscape. The valley fill disposals retained by earthen dams in rugged terrain with a rolling to hilly surface would not be visually compatible in most cases. The flatter disposal areas would tend to impose a raised landform upon the landscape and the resultant surface configurations would contrast with the existing landscape. In both cases, it could be anticipated that the existing vegetation types would not be replaced in kind during rehabilitation, but, rather would require many years for natural types to invade the area, if at all. Color and textural contrasts could be expected to create a visual contrast in most areas.

Specific contrasts in form, line, color, and texture indicate problems that could require design mitigation. Applying design procedures to the proposed actions could eliminate or reduce visual contrasts to meet the visual planning objectives stipulated in the VRM class designations. If this were done, the projects would be reassessed to determine if they could meet the area's visual goals, and if not, to what degree the landscape's visual resource would be affected.

ABBREVIATIONS GLOSSARY, AND REFERENCES

REFERENCES

The following symbols are used to help the reader locate copies of the references. The appropriate symbol will appear at the end of each citation.

E - May be inspected at BLM, Division of Environmental Impact Statement Services, 555 Zang Street, First Floor East, Denver, Colorado 80228. Copies of some items are available at cost for reproduction.
L - Obtainable through public library loan system.
M - Obtainable at Bureau of Land Management, Moab District Office, P.O. Box 970, 125 West 2nd South, Moab, Utah 84532.
P - Obtainable at BLM, Price River Resource Area Office, P.O. Box AB, 900 North 7th East, Price, Utah 84501.
U - May be inspected at BLM, Utah State Office, University Club Building, 136 East South Temple, Salt Lake City, Utah 84111.

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ERS, see U.S. Department of Agriculture, Economic Research Service.

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ABBREVIATIONS

Ac-ft/yr—acre-feet per year

AQRV—air quality related values

AUM—animal unit month

BLM—Bureau of Land Management, U.S. Department of the Interior

bpd—barrels per day

Btu—British thermal unit

CCD—Census County Division

CO—carbon monoxide

D&RGW—Denver and Rio Grande Western Railroad

EIS—environmental impact statement

EPA—U.S. Environmental Protection Agency

FS—Forest Service, U.S. Department of Agriculture

FWS—Fish and Wildlife Service, U.S. Department of the Interior

mg/l—milligram per liter

ug/m^3—microgram per cubic meter

mbpd—million barrels per day

MFP—management framework plan

MVMT—million vehicle miles traveled

NAAQS—National Ambient Air Quality Standards

NEPA—National Environmental Policy Act

NPS—National Park Service, U.S. Department of the Interior

NO$_x$—nitrogen oxide

NO$_2$—nitrogen dioxide

NPS—National Park Service, U.S. Department of the Interior

O$_3$—ozone

ORV—off-road vehicle

PCPI—per capita personal income

ppm—parts per million

PSD—prevention of significant deterioration

SCS—Soil Conservation Service, U.S. Department of Agriculture

SO$_2$—sulfur dioxide

SO$_4$—sulfates

SR—state road

STSA—special tar sand area

TDS—total dissolved solids

TSP—total suspended particulates

UDEH—Utah Division of Environmental Health

UDGOM—Utah Division of Oil, Gas, and Mining

UDOT—Utah Department of Transportation

UDWR—Utah Department of Wildlife Resources

URA—unit resource analysis

USGS—Geological Survey, U.S. Department of the Interior

USLE—Universal Soil Loss Equation

VMT—vehicle miles of travel

VRM—visual resource management

VTPD—vehicle trips per day

WSA—wilderness study area

GLOSSARY

ACCELERATED EROSION—erosion more rapid than normal, natural, or geologic erosion, occuring mainly as a result of the influence of human activities.

ACRE-FOOT—A volume that will cover an area of 1 acre to a depth of 1 foot (43,560 cubic feet or 325,851 gallons).

AIR QUALITY CLASS I, II, AND III AREAS—Regions in attainment areas where maintenance of existing good air quality is of high priority. In Class I areas, maintaining air quality has the highest priority with respect to other values; in Class III areas, air quality has lower priority than it does in the other areas. All attainment areas except mandatory Class I areas were initially designated Class II.

AIR QUALITY CRITERIA—The varying amounts of pollution and lengths of exposure at which specified adverse effects to health and welfare occur.

AIR QUALITY MODEL—A mathematical representation of the behavior of air pollutants or their effects on air quality related values.

AIR QUALITY RELATED VALUE (AQRV)—A feature or property of an area, such as visibility, that is affected in some way by air pollution.

AIRSHED—The air encompassing a specific geographic region.

ALLUVIAL FAN—Unconsolidated sedimentary material deposited by streams in fan- or cone-shaped deposits at the base of mountains.

AMBIENT AIR QUALITY—Concentration levels in ambient air for a specified pollutant and a specified average time period within a given area.

AMBIENT AIR:—Any unconfined portion of the atmosphere; the outside air.

AMBIENT AIR QUALITY STANDARD—A legal limit on the amount of a given pollutant permitted in the ambient air. Primary standards are those judged needed with an adequate margin of safety to protect the public health. Secondary standards are those judged needed to protect the public welfare from any known or expected adverse effects of a pollutant. Ambient standards are given in micrograms per cubic meter (ug/m^3).

ANCILLARY FACILITIES—Structures (compressor stations, power and communication lines, cathodic protection systems) that are needed for the continuous operation or maintenance of a project.

ANIMAL UNIT MONTH—The amount of forage needed to sustain for 1 month the equivalent of 1 cow, 6.2 sheep, 5.8 deer, 9.6 antelope, 5.5 bighorn sheep, or 2.2 burros (usually 800 pounds of usable air-dried forage).

AQUIFER—A water-bearing bed or layer of permeable rock, sand, or gravel, capable of yielding water.

ARCHAIC PERIOD/TRADITION:—A culture period characterized by hunting and gathering subsistence patterns; the development of barbed and stemmed projectile points for use of spears, grinding and milling stones for food preparation, and ground and polished stone tools for everyday use; and the adoption of a seasonally migratory life-style. Sites of this period usually date to 7500–1500 years before the present.

ASPECT (Soils and Vegetation)—The direction in which a slope faces.

BARREL—A liquid measure of oil, usually crude oil, equal to 42 gallons or about 306 pounds.

BASELINE—In this EIS, projected conditions expected to exist in the area of influence, excluding applicant and interrelated projects.

BITUMEN—A naturally occurring viscous mixture of hydrocarbons, such as asphalt, which may contain sulphur compounds and which, in its naturally occurring state, is not recoverable at a commercial rate through a well. When processed, however, bitumen produces a synthetic oil.

BODY FOSSIL—The fossilized body or body part of a plant or animal.

BRITISH THERMAL UNIT (Btu)—The amount of heat needed to raise the temperature of 1 pound of water by 1 degree Fahrenheit at 60° F.

BROWSERS—Cattle, deer, elk, and other animals that usually eat tender shoots, twigs, tree leaves, shrubs, or woody vines.

CADASTRAL—Showing or recording property boundaries, subdivision lines, buildings, and other related details.

CARBON MONOXIDE (CO)—A colorless, odorless, toxic gas produced by the incomplete combustion of carbon-containing substances. One of the major air pollutants, CO is emitted in large amounts in the exhaust of gasoline-powered vehicles.

CENSUS COUNTY DIVISION (CCD)—A county division used by the Bureau of the Census for listing some census data. Maps showing CCD boundaries are included in the population census report for each state.

CHAINING—A method of increasing forage production by which two bulldozers drag an anchor chain across an area and uproot target plants, particularly pinyon and juniper.

CLIMAX—The highest ecological development of a plant community capable of perpetuation under the prevailing climate and soil conditions.

COFFERDAM—A watertight enclosure from which water is pumped to expose a streambed or lakebed to permit construction.

COKER NAPHTHA—Volatile hydrocarbon mixtures recovered from the coking process.

COLLECTIVE IMPACTS—In this EIS, impacts that would result from the proposed actions or alternatives.

COLLUVIAL—Pertaining to rock debris and soil accumulated at the foot of a slope.

COMBINED HYDROCARBON LEASE—A lease issued in a Special Tar Sand Area (STSA) that entitles the lessee to remove any gas or nongaseous hydrocarbon substance other than coal, oil shale, or gilsonite.

CONGLOMERATE—Sedimentary rock composed of pebbles of granule size or larger; consolidated gravel.

COW-CALF LIVESTOCK OPERATION—A livestock operation in which a base breeding herd of mother cows and bulls is maintained. The cows produce a calf crop each year, and the operation keeps some heifer calves from each calf crop for breeding herd replacements. The operation sells the rest of the calf crop between the ages of 6 and 12 months along with old or nonproductive cows and bulls.

COW-CALF-YEARLING LIVESTOCK OPERATION—A cow-calf operation that, instead of selling its calves between the ages of 6 to 12 months, sells them after the age of 12 months.

CRETACEOUS—Of, relating to, or being the last period of the Mesozoic era or the corresponding system or rocks, estimated to be between 70 million and 135 million years ago.

CULTURAL RESOURCES—Those fragile and nonrenewable remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in past human events. These resources consist of 1) physical remains, 2) areas where significant human events occurred, even though evidence of the event no longer remains, and 3) the environment immediately surrounding the actual resource.

CUMULATIVE IMPACTS—For this EIS, impacts that would occur as a result of the activities of other projects (interrelated projects) in the area, whose impacts would occur in addition to and overlapping in time and place with the impacts of the Sunnyside projects.

DECANT—To draw off without disturbing the sediment or the lower liquid layers.

DECOMMISSION—Abandonment.

DENDRITIC DRAINAGE PATTERN—A drainage pattern whose tributaries branch like a tree.

DRAINAGE WIND—A wind directed down the slope of an incline and caused by greater air density near the slope than at the same level some distance horizontally from the slope.

EMISSION—Effluent discharge into the atmosphere, usually specified by mass per unit time.

EMISSION INVENTORY—A data set of emission source information, usually applied in an air quality simulation model; a list of air pollutants emitted into a community's atmosphere in amounts (commonly tons) per day by type of source.

ENDANGERED SPECIES—Any animal or plant species in danger of extinction throughout all or a significant portion of its range as designated by state or federal laws.

Glossary

ENVIRONMENTAL IMPACT STATEMENT (EIS)—An analytical document required for major federal action by the National Environmental Policy Act and developed for use by decisionmakers to weigh the environmental consequences of a potential decision. An EIS should accurately portray potential impacts on the human environment of a particular course of action and its possible alternatives.

FLUVIAL—Of, relating to, or living in a stream or river.

FORAGE—All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for food.

FORB—A broad-leafed herb.

FOSSIL—Any evidence of a plant or animal that has been preserved by natural processes in the Earth's crust since some past geologic time.

FREE WATER—Water in the soil that drains by gravity.

FREMONT CULTURE—A stage of civilization that evolved after 900 AD, whose people are known for their sheephide moccasins, elaborate clay figurines, rock paintings of Kachinas (supernatural beings), and raised or appliqued ornaments with punched designs. Evidence of this culture has been found mainly along the Fremont River in central Utah and in southeast Nevada.

FRIABLE—Easily crumbled or pulverized.

FUGITIVE DUST—Solid airborne particles emitted from any source other than a stack.

GASTROPOD—A large group of mollusks that have one-piece spiral shells or no shells at all and that move by means of a broad, muscular ventral disk. Examples include snails, limpets, and certain types of slugs.

GILSONITE (UINTANITE)—A black, shiny asphaltite, with a brown streak and conchoidal fracture, which is soluble in turpentine and occurs mainly in veins in the Uinta Basin of Utah.

HABITAT—A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living spece.

HYDROCARBONS—Organic chemical compounds of hydrogen and carbon atoms that form the basis of all petroleum products.

INCREMENTS (Air Quality)—Maximum allowable increases over baseline concentrations of pollutants covered by the PSD provisions in Class I, II, and III areas.

INFRASTRUCTURE—The set of supporting systems and facilities that support a region's or community's social and economic structures. Examples of such systems include transportation, education, medical service, communication, fire protection, and police protection.

IN-SITU EXTRACTION—Extracting bitumen from tar sand while it is still in the ground by injecting steam, solvents, heat, or a combination of the three.

INTERRELATED PROJECTS—Projects with plans for development whose activities would overlap in time with the proposed actions or alternatives and which would cause environmental impacts that would interact with those of the proposed actions or alternatives.

ISOPLETH—A line or contour drawn on a map denoting points having equal value of a quantity, such as temperature, pressure, or pollutant concentrations.

LACUSTRINE—Pertaining to, living in, growing in, formed in, or belonging to lakes.

LEACHATE—A solution or product obtained by percolating liquid to dissolve soluble components.

LEVEL-OF-SERVICE—In transportation studies, a qualitative measure of traffic flow along a given road in consideration of a variety of factors, including speed and travel time, traffic interruptions, and freedom to maneuver. Levels-of-service are designated A through F, A being a free-flow condition with low volumes and high speeds and F being a congested condition of low speeds and stop-and-go traffic. Intermediate levels describe conditions between these extremes. A level-of-service below C involves unstable to forced traffic flow in which a driver's freedom to select a speed is restricted and in which traffic stoppages cause congestion.

LINEAR SOURCE—A line or trajectory at which material is added to a system either instantaneously or continuously.

LITHIC SCATTER—A site containing debris from the manufacture, use, or maintenance of flaked stone tools.

MAIN BLOCK—In this EIS, the largest contiguous block of land within the Sunnyside Special Tar Sand Area in Carbon County, Utah.

MANAGEMENT FRAMEWORK PLAN (MFP)—A public land use plan that identifies the goals and constraints for a specific area and provides guidance for managing the area's resources.

MANDATORY CLASS I AREA (AIR QUALITY)—An area given a Class I air quality designation by the Clean Air Act of 1977. Such areas include existing (1977) international parks; national wilderness areas or national memorial parks larger than 5,000 acres; and national parks larger than 6,000 acres. States may not reclassify mandatory Class I areas.

MAXIMUM PEAK DEMAND CONDITION—The highest volume of traffic passing along a given road segment or by a given point for a given time period.

METALLIFEROUS—yielding or containing metals.

MICROCLIMATE—Climatic conditions characteristic of a small area. Microclimates are influenced by local geography and vegetation and may greatly differ from regional climate in temperature, wind, length of growing season, or precipitation patterns.

NATIONAL REGISTER OF HISTORIC PLACES (NRHP)—Maintained by the Secretary of the Interior, a list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

NOXIOUS WEED—A weed that is undesirable because it conflicts, restricts, or otherwise causes problems under range management objectives.

OFF-ROAD VEHICLE (ORV)—Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain, excluding (a) any registered motorboat, (b) any fire, military, emergency, or law enforcement vehicle when used for emergencies and any combat or combat support vehicle when used for national defense, and (c) any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, or contract.

PALEO-INDIAN—Earliest documented hunting and gathering groups in North America, generally dating from 12,000 to 6,000 BC.

PALEONTOLOGY—A science dealing with the life of past geological periods as known from fossil remains.

PARTIAL CONVERSION ALTERNATIVE—An alternative to convert only part of the leases to combined hydrocarbon leases.

PARTICULATE—A particle of solid or liquid matter: soot, dust, aerosols, fumes, and mist.

PEDIMENT—A broad gently sloping bedrock surface with low relief at the base of a steeper slope, which is usually thinly covered with alluvial gravel and sand.

pH—A numeric value that gives the relative acidity or alkalinity of a substance on a 0 to 14 scale with the neutral point at 7.0. Values below 7.0 are acidic, and values above 7.0 are alkaline.

PHOTOCHEMICAL OXIDANTS—Pollutants in the air (nitrogen dioxide, ozone) that are formed in areas of intense sunlight and result in extremely reactive chemical substances that damage plants and materials and cause health problems.

PHOTOCHEMICAL PROCESS—The chemical changes brought about by the radiant energy of the sun acting upon polluting substances. The products are known as photochemical smog.

PHOTOCHEMICAL SMOG—The smog prevalent in the daytime around sunny, poorly ventilated, heavily motorized urban areas and characterized by the interaction of nitrogen oxides and certain hydrocarbon compounds under the influence of sunlight and, normally in relatively stagnant air. Automotive exhaust is a prime source of the gases that can produce this form of pollution.

PHYSIOGRAPHIC PROVINCE—A region whose pattern of relief features or landforms differ significantly from that of adjacent regions.

PIEZOMETER—An instrument for monitoring water levels.

PLAN OF OPERATIONS—A mandatory plan, developed by an applicant for a mine or construction project, that specifies the techniques and measures to be used during construction and operation of all project facilities on public land. The plan is submitted for approval to the appropriate federal agency before any construction begins.

PLUME (Air Quality)—The volume of air space containing any of the substances emitted from a source characteristically shaped stream of materials or heated gases entering the atmosphere from a localized source such as a stack. A plume may be visible (smoke, water droplets) or invisible (heated air).

POLLUTANT (AIR QUALITY)—Any substance discharged into the ambient air that tends to create a harmful effect upon man, his property, convenience, or happiness or that causes the contamination in ambient air to exceed legally established limits.

PPM—Parts per million, the number of parts of a given pollutant in a million parts of air or water; a measure of concentration.

PREVAILING WIND—The wind direction most often observed during a given period.

PREVENTION OF SIGNIFICANT DETERIORATION (PSD)—A regulatory program based not on the absolute levels of pollution allowable in the atmosphere but rather on the amount by which present air quality will be allowed to deteriorate in a given area.

PRIME AGRICULTURAL LAND (PRIME FARMLAND)—Land that is best suited for producing food, feed, forage, fiber, and oilseed crops. The inventory of prime agricultural land is maintained by the U.S. Department of Agriculture, Soil Conservation Service.

PROJECT LIFE—The time from the first disturbance to the recovery of understory vegetation. For tar sand development in the Sunnyside STSA, project life would include project construction, operation, abandonment, reseeding, and 4 years for understory revegetation.

PUBLIC LANDS—Federal lands administered by the Bureau of Land Management.

RANGE CONDITION—The state of rangeland based on the potential vegetation it is capable of producing.

RECLAMATION—The process of reconverting disturbed lands to their former uses or other productive uses.

REGIMEN (WATER)—The characteristic behavior and the total quantity of water involved in a drainage basin. Regimen is determined by measuring such quantities as rainfall, surface and subsurface storage and flow, and evapotranspiration.

RETORTING—To treat oil shale by heating in a vessel in which substances are distilled or decomposed by heat.

RILL—A channel made by a small stream.

RIPRAP—A layer of rock, cobbles, or fragments that are large enough to resist the erosive forces of flowing water or wave action. Such structures are usually used to protect channels, slopes on dams, or outlets of structures.

ROAD SEGMENTS—Designated roadway segments for which specific traffic data is collected.

RUN-OF-MINE ORE—Raw ore as it is devlivered by mine cars, skips, or conveyors and before any treatment.

SCARIFICATION—Mechanical disturbance of the upper soil layer in preparing a site for seeding or planting.

SCOPING—An early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, and written comments in response to news releases, direct mailings, and articles about the proposed action and scoping meetings.

SCREENING—A simplistic approach designed to determine the need for more detailed analysis.

SENSITIVE PLANT SPECIES—Plants whose populations are consistently small and widely dispersed or whose ranges are restricted to a few localities, such that any appreciable reduction in numbers, habitat availability, or habitat condition might lead toward extinction. Sensitive plants also include species rare in one locality but abundant elsewhere. See Endangered Species and Threatened Species.

SLASH—Logging debris strewn in a forest.

SLURRY—A watery mixture of a solid and a liquid.

SOIL PRODUCTIVITY—The capacity of a soil in its normal environment to produce a plant or sequence of plants under a system of management.

SOIL PROFILE—A vertical section of a soil that shows all its horizons and its parent material.

SPECIFIC GRAVITY—The ratio of the density of one substance to the density of another substance (as pure water or hydrogen) taken as standard when both densities are measured by weighing in air.

SPENT SAND—Sand exhausted of active or required components or qualities for a particular purpose.

SPECIAL TAR SAND AREA (STSA)—An area having large deposits of tar sand as identified by the Department of the Interior in the Federal Register—November 20, 1980 (45 FR 76800) and January 21, 1981 (46 FR 6077). All STSAs are located in Utah.

SPOIL—Earth and rocks excavated or dredged.

STEADY-STATE OPERATIONS—Operating a plant at design capacity and operating a mine at its full production size, at which time the most acres would be disturbed at any one time, and for each new acre disturbed an acre would be revegetated.

SULFUR OXIDES—Pungent, colorless gases formed mainly by the combustion of fossil fuels. Considered major air pollutants, sulfur oxides may harm the human respiratory tract as well as damage vegetation.

SYNFUELS—Fuels synthesized from sources other than crude oil or natural gas and used in place of them or their derivitives. Synfuels are used mainly for transportation and heating boilers.

TAILINGS—Waste material resulting from the screening or processing of ore.

TAR SAND—A sand that is naturally impregnated with petroleum.

TAR SAND ORE CLASSIFICATION SYSTEM—An ore classification system adopted by Enercor (1982) from U.S. Geological Survey Bulletin 1450-B (Bureau of Mines and Geological Survey 1976). Definitions are as follows:

> **MEASURED RESOURCES**—Resources computed from dimensions, revealed in outcrops, trenches, mine workings, or drill holes.
> **INDICATED RESOURCES**—Resources computed partly from specified measurements and partly from projecting visible data for a reasonable distance from geologic evidence.
> **INFERRED RESOURCES**—Quantity estimates based largely on a broad knowledge of the geologic formation in the bed or region and on a few measurements of thickness.

THERMAL EXTRACTION—A method of extracting bitumen by the use of heat.

THREATENED SPECIES—Any plant or animal species likely to become endangered within the foreseeable future throughout all or a part of its range as designated by state or federal laws.

TOTAL DISSOLVED SOLIDS (TDS) SALT—An aggregate of dissolved carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts. High TDS concentrations can change the chemical nature of water, exert varying degrees of osmotic pressures, and often become lethal to life in an aquatic environment.

TOTAL SUSPENDED PARTICULATE MASS (TSP)—A pollutant measured as the mass of all particles in the atmosphere without regard to size or chemical composition.

TRACE FOSSIL—A sedimentary structure consisting of a fossilized track, trail, burrow, tube, boring, or tunnel resulting from an animal's life activities other than growth.

TRAILING (Livestock)—Controlled directional movement of livestock. Natural trailing is the habit of livestock or wildlife to repeatedly tread in the same line or path.

UNCONFORMITY—A large break in a rock sequence, usually found on an eroded surface.

UNDERSTORY—Plants growing beneath the canopy of other plants, often grasses, forbs, and low shrubs growing under a tree or brush canopy.

UNGULATES—Hoofed mammals, most of which are herbivores and many of which have horns.

UPWIND—The direction from which the wind is blowing.

VALLEY WINDS—Winds that ascend a mountain valley during the day.

VEGETATION TYPE—A plant community with distinguishable characteristics described by the dominant vegetation present.

VISITOR DAY—12 visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more people.

VISUAL RESOURCE MANAGEMENT—The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all resource management activities.

VISUAL RESOURCE MANAGEMENT (VRM) CLASS—The degree of visual change that is acceptable within the existing characteristic landscape. An area's classification is based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective.

WATER BAR—A low (several inches high) barrier (usually of logs, stone, soil, or concrete) placed across a trail or road on a slope to divert water and prevent erosion.

WILDERNESS AREA—An area officially designated as wilderness by Congress. Wilderness areas are managed to preserve wilderness characteristics and are devoted to the public purposes of conservation, recreation, and scenic, scientific, educational, and historical uses.

WILDERNESS STUDY AREA (WSA)—A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act and Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

WORK FORCE—The total number of workers on a specific project or group of projects. The work force is also referred to as direct employment or primary employment.

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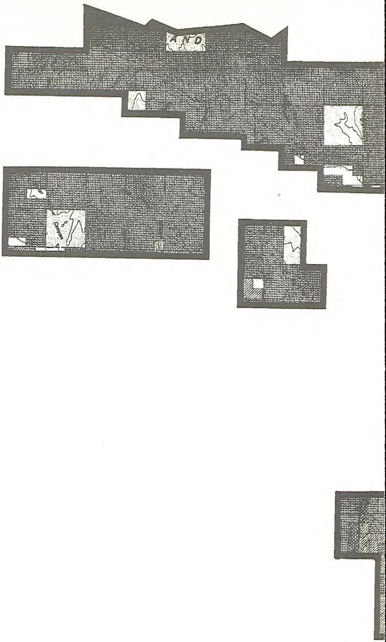

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